

Photographed at the Office of the Trigonometrical Branch, Survey of India, Dehra Dun, December 1882

C. G. Olden, Esq.

C. P. R. R.

SYNOPSIS OF THE RESULTS OF THE OPERATIONS OF
THE GREAT TRIGONOMETRICAL SURVEY OF INDIA
VOLUME XIV.

DESCRIPTIONS AND CO-ORDINATES
OF THE
PRINCIPAL AND SECONDARY STATIONS AND OTHER FIXED POINTS OF
THE BUDHON MERIDIONAL SERIES
OR SERIES J
OF THE
NORTH-EAST QUADRILATERAL.

BY LIEUT.-GENERAL J. T. WALKER, C.B., R.E., F.R.S., &c., &c.,
SURVEYOR GENERAL OF INDIA, AND SUPERINTENDENT OF THE TRIGONOMETRICAL SURVEY,
AND HIS ASSISTANTS.



Dehra Dun:

PRINTED AT THE OFFICE OF THE TRIGONOMETRICAL BRANCH, SURVEY OF INDIA.

B. V. HUGHES.

1883.

CONTENTS.

ERRATA ET ADDENDA	iv
REFERENCES	v
PREFACE	vii
Introduction	iii—J.
Alphabetical List of Principal Stations	1—J.
Numerical do. do. 	2—J.
Description of Principal Stations	3—J.
Addendum to Description of Principal Stations	11*—J.
Principal Triangles	11—J.
Secondary Triangles connecting Principal-Auxiliary Stations and Intersected Points	16—J.
Azimuths of Surrounding Stations and Points, at Principal, Principal-Auxiliary and Secondary Stations	22—J.
Co-ordinates and Descriptions of all Stations and Points	28—J.
CHARTS Nos. 1 and 2	

ERRATA ET ADDENDA.

- 5—*J.* line 21 from bottom *for* surmounted by *read* about 20 feet to the east of
 15—*J.* after Triangle No. 57 *insert* the following triangles:—

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
57 _a	Mahesari, LII	1°05	31 17 35·66	4·9420246	87503·4	16·573
	Mábegarh, I	1°05	65 23 37·74	5·1851627	153166·1	29·009
	Chándípahár, LIV	1°05	83 18 46·60	5·2235428	167318·0	31·689
57 _b	Mahesari, LII	·98	66 5 4·25	5·1541808	142620·1	27·011
	Chándípahár, LIV	·98	34 52 53·06	4·9504707	89221·7	16·898
	Godhna, XLIX	·99	79 2 2·69	5·1851627	153166·1	29·009

NOTE.—Stations XLIX, LII and LIV appertain to the Great Arc Meridional Series, Section 24° to 30°, of the North-West Quadrilateral, and I appertains to the North-East Longitudinal Series of the North-East Quadrilateral.

- 23—*J.* line 14 from top, col. 5 *for* Tinsmál, VII* *read* Tinsmál, VII*
 „ in cols. 5 and 6 *after* line 6 from bottom *insert* Mahesari, LII 4 34 26·63 |57_a|
 „ „ „ „ 1 „ „ Mábegarh, I 281 15 38·98 |57_a|
 24—*J.* „ 3 and 4 „ „ 16 „ „ Mahesari, LII 298 20 54·38 |57_b|
 25—*J.* „ „ „ „ 2 „ „ Chándípahár, LIV 101 23 45·00 |57_a|
 „ „ 5 and 6 „ „ 16 from top „ Godhna, XLIX 118 28 12·87 |57_b|
 „ „ „ „ „ Chándípahár, LIV 184 33 18·10 |57_a|
 27—*J.* az. of Rámghat House, col. 1 *for* 112° 34' 30' *read* 141° 1' 22"
 30—*J.* line 14 from top, col. 2 „ No. 79 „ No. 57_a
 33—*J.* lines 21 & 22 from top, col. 3 „ Moradabad s. on Collec- „ Moradabad Collector's Kachahri
 „ „ „ „ „ tor's Kachahri „ Staircase.
 34—*J.* latitude and longitude of Rámghat House „ { 28° 5' 42"·2 „ { 28° 9' 0"·6
 „ „ „ „ „ { 78 25 45·4 „ { 78 28 32·5

January, 1883.

J. B. N. HENNESSEY,
In charge of Computing Office.

REFERENCES.



The abbreviations employed in the text are as follows:—

h.s. denotes hill station secondary

s. „ station secondary

These abbreviations are only placed after stations where a theodolite has been set up and observations taken to surrounding points.

The latitudes and longitudes of all points shown on the Charts at the end of this volume will be found in the text. The latter exhibits numerical values of triangles only to points of a superior class, to which alone, if exhibited on the Charts, lines are drawn: these lines are either continuous throughout, or dotted for half the length and continuous for the other half: the dots indicate that the bearing was not observed, and in such cases numerical values of azimuths are not given. For other points, difficult to identify or of comparatively less accuracy, numerical values of triangles or azimuths are not given.

January, 1883.

J. B. N. HENNESSEY,

In charge of Computing Office.

P R E F A C E.

~~~~~

The Budhon Meridional Series is the westernmost of all the meridional chains of triangles included in the Section of the Principal Triangulation of the Survey of India which has been named the North-East Quadrilateral. This Section embraces the area within the Meridians of  $78^{\circ}$  and  $92^{\circ}$  and the Parallels of  $23^{\circ}$  and  $30^{\circ}$ ; and for reasons explained in Section 7 of Chapter I of Volume II of the *Account of the Operations of the Great Trigonometrical Survey*, its general reduction was postponed till that of the neighbouring Quadrilaterals, *viz.*, the North-West and South-East, had been completed, whereby two of the Series, the Great Arc, Section  $24^{\circ}$  to  $30^{\circ}$ , and the Calcutta Longitudinal, entering the periphery of the North-East Quadrilateral, became finally fixed. When the reduction of this Quadrilateral came to be taken in hand it was found that the Budhon Series, while emanating from the Calcutta Longitudinal Series, and terminating on the Great Arc Series, Section  $24^{\circ}$  to  $30^{\circ}$ —the two Series above mentioned—was so slightly connected with the rest of the triangulation of the North-East Quadrilateral, that the mutual influence would be practically imperceptible. It was therefore determined to reduce the Series by itself. The general principles of the Simultaneous Reduction of the Series and the procedure followed in carrying it out, are the same as have been explained in Volume II of the *Account of the Operations, &c.* An abstract of the reduction itself is given in Appendix No. 1 to Part I of Volume VII, and all other details of the principal triangulation are given in Part II of that Volume.

As however the entire contents of the volumes of the principal triangulation are not needed by geographers and surveyors, and moreover as these volumes give no details of the secondary triangulation—which is of considerable value for local requirements—it is obviously desirable that synopses of the final results of the whole of the operations, including the secondary as well as the principal triangulations, should be published for general use, in such a form as to be most suitable for convenience of reference. This has already been done for the several Series forming the North-West Quadrilateral, as follows:—

- I. Great Indus Series.
- II. Great Arc, Section  $24^{\circ}$  to  $30^{\circ}$ .
- III. Karáchi Longitudinal Series.
- IV. Gurmágarh Meridional Series.
- V. Rahún Meridional Series.
- VI. Jogí-Tíla and Suttlej Series.
- VII. North-West Himalaya Series.

And for the following Series of the South-East Quadrilateral, *viz.*,

- VIII. Great Arc, Section  $18^{\circ}$  to  $24^{\circ}$ .
- IX. Jabalpur Meridional Series.
- X. Bider Longitudinal Series.
- XI. Biláspur Meridional Series.
- XII. Calcutta Longitudinal Series.
- XIII. East Coast Series.

} Already published.

The present is the 14th Synoptical Volume and the first of those appertaining to the North-East Quadrilateral, and it gives the results of the whole of the triangulation, both the principal, which was executed with theodolites having azimuthal circles of 15 and 18 inches in diameter read by 3 micrometer microscopes, and the secondary, which was executed with smaller theodolites, having circles of 7 to 12 inches in diameter, read by verniers.





# BUDHON MERIDIONAL SERIES.



BUDHON MERIDIONAL SERIES—(LONG.  $78^{\circ} 30'$ )

## INTRODUCTION.

In the year 1830 when the first measurement of the Calcutta Longitudinal Series was approaching completion, the Hon'ble the Court of Directors of the East India Company expressed a wish that a number of series of triangles should be carried northwards and southwards from certain sides of this triangulation, in order to connect together the isolated surveys which had already been made in various provinces and districts, and to furnish reliable bases for future surveys. The Surveyor General—then Captain G. Everest of the Bengal Artillery—in an exhaustive letter dated 12th October 1831, discussed all preliminaries for giving effect to the wishes of the Hon'ble Court, in regard to the number of the series to be undertaken, the character of the country to be traversed by each, the necessary additions to the then-existing establishment, and the probable cost of the operations.

During the year 1831-32 the requisite instruments for carrying out this scheme of triangulation were procured and instruction given to the officers and assistants selected for the work—one of a high order of accuracy—in which they had had no previous experience.

The first series undertaken was the Budhon, one of the 13 meridional chains now included in the North-East Quadrilateral. It follows the meridian of  $78^{\circ} 30'$  as nearly as was practicable, and lies immediately to the east of the Northern Section of the Great Arc Series (E. Long.  $78^{\circ}$  and N. Lat.  $24^{\circ}$  to  $30^{\circ}$ ). It was begun in 1832-33 at its southern end in the Saugor (Ságar) District, based on the side Budhon-Tinsmál of the Calcutta Longitudinal Series.

For about the first two and a half degrees (155 miles) of its length it was carried for the most part as a single chain of triangles across the north-eastern spurs and outliers of the Vindhya range which forms the southern watershed of the great Gangetic plain, traversing the modern districts of Saugor, Lalitpur, and Jhánsi, the Native States at the N. W. corner of Bundelkhand, and that of Gwalior, in which a good many secondary stations and places of interest or importance were fixed, including Tehri, the ancient town of Orchha and its modern successor Jhánsi, Datia, Narwar, and Gwalior.

To the north of Gwalior the Series left the hills and descended into the valley of the Chambal and Jumna, requiring henceforward the aid of towers and the heavy labour of ray-clearing, which greatly retarded its progress. Leaving Gwalior it passed through the districts of Agra, Mainpuri, Etah and Aligarh, striking the Ganges in latitude  $28^{\circ}$ , whence it was con-

tinued as a double series, with shorter sides, arranged in five polygonal figures, to its northern limit about latitude  $30^{\circ}$  where it reached the outlying hills at the foot of the Himalayas and closed upon stations of the Great Arc and N. E. Longitudinal Series, having traversed the districts of Budaun, Moradabad, Bijnor, and Muzaffarnagar, with one station in the Taráí and two in British Garhwál. The Budhon Series was brought to a close in the year 1842-43, a period of ten years having been occupied in completing about six degrees of distance along the meridian or about 400 miles.

The officer selected for the conduct of this Series was Lieutenant Roderick Macdonald of the 69th Bengal Native Infantry, an officer of the Revenue Survey who had been reported by the head of that department as "well fitted for employment in the Great Trigonometrical Survey and desirous of obtaining it". He was appointed a Second Assistant in the Department in March 1832, and in October the sanction of Government was obtained for a party to be employed under his orders, as follows:—A Principal and one Junior Sub-Assistant with a Native Establishment of the usual strength.

The party was organized in Calcutta under the supervision of the Surveyor General

*1st Season 1832-33.*

PERSONNEL.

Lieut. R. Macdonald, 2nd Assistant.  
Mr. W. N. James, Principal Sub-Assistant.  
" J. H. Scully, 3rd Class "

*Subsequently in March 1833.*

" E. Cropley, 3rd Class Sub-Assistant.  
" R. Loane, " "

himself, and started on its long march to the field on the 23rd November 1832 provided with a 15-inch Theodolite by Harris and Barrow for the principal observations. It reached the town of Saugor (Ságar) on the 28th of January 1833 when a part of the native establishment struck for higher wages, and had to be replaced by new hands picked up on the spot; but Lieutenant Macdonald

pushed on and arrived at Budhon H. S. his first station, 22 miles N. W. from Saugor, on the 2nd February. This station and that of Tinsmál distant 30 miles to the eastward, defined the west and east ends of the base or side of origin for the new Series. They were both found intact, but much overgrown by jungle infested with wild beasts, since last visited and observed at for the Calcutta Longitudinal Series by Mr. Olliver eight years previously (in 1825).

The selection of the requisite stations in advance was taken in hand at once, and the junior Sub-Assistant sent on to select the best point available in the desired direction and to burn lights thereat; these however could not be seen without some artificial elevation, and it was only on the 23rd February that the final observations at Budhon could be begun. They were finished by the 27th, and the main party marched to Tinsmál where it was found necessary to raise the station platform by 8.5 feet to command the ray to Patna (I)\* and overlook a small temple that obstructed the view. Whilst the building was going on, Lieutenant Macdonald proceeded to select the next two stations in advance on the east flank, Dargawa (II) and Dhandkúa (III) and having returned to Tinsmál, completed the observations by the 15th of March. Whilst there, the Surveyor General, who was on his way to resume the operations on the Great Arc, visited the party, and before going on, left two more Sub-Assistants, Messrs. E. Cropley and R. Loane with Lieutenant Macdonald.

\* The Roman number in brackets after the name of a station indicates its position in numerical order from south to north.

The signals observed during this season and for some seasons to come, were flags by day and vase-lights by night.

Patna (I) was next visited, but hazy weather prevented the completion of the principal angles before the 23rd of April, the time between the two short periods of clearer weather being utilized by fixing as many secondary stations and points as practicable. Dargawa (II) and Dhandkúa (III) were next visited and the observations completed by the 3rd of May, when the principal observing was stopped by hazy weather and by obstruction met with from the inhabitants, who regarded the survey operations with suspicion and dislike, and hindered the advanced party continually.

Lieutenant Macdonald endeavoured to complete another triangle but failed, although he waited at Sirsaud (afterwards abandoned for Andhiári, IV) from 13th May to 25th June without having a single good night for observing. Indeed, the length of the rays here—over 30 miles—was too great for the requisite visibility at this season, unless the air were cleared by a general fall of rain. The party then went into recess quarters at Saugor.

The out-turn of work for the first season (1832-33) shews but three principal triangles completed, covering about 1000 square miles of country and stretching to a point nearly 50 miles north of the origin of the Series. But a good deal of secondary or minor triangulation had been accomplished, by which a number of points were determined, especially in and around the first triangle, when the weather was comparatively clear and suitable. A few commanding points were selected and observed at whilst marching between the principal stations, whereby many other places and landmarks which could be seen from two or more of the stations were fixed. For this work Lieutenant Macdonald appears to have used his large theodolite, employing his principal Sub-Assistant with a smaller instrument to supplement his work at the minor stations which he was unable to visit, whilst to the junior Sub-Assistant was entrusted the difficult task of selecting and building the principal stations in advance.

At the close of the recess an epidemic fever broke out at Saugor and attacked three

2nd Season 1833-34.

PERSONNEL.

Lieut. R. Macdonald, 1st Assistant.  
 " P. Bridgman, Bengal Artillery, 2nd Asst.  
 (*sick and ineffective.*)  
 Mr. W. N. James, Principal Sub-Assistant.  
 " J. H. Scully, 3rd Class " "  
 " E. Cropley, " "  
 (*died 27th Oct.*) "  
 " R. Loane, 3rd Class Sub-Assistant.

of the Sub-Assistants, one of whom, Mr. E. Cropley, died on the 27th October. It may be now noted that Lieutenant Bridgman who had recently been appointed as 2nd Assistant to the party, was prevented by sickness from joining until 15th February 1834 and further incapacitated for field duties until April, when he was entrusted with the execution of a secondary series in the vicinity of Gwalior,

with Mr. Loane for his assistant: but although he kept the field until the end of July he appears to have contributed little or nothing worth mentioning to the season's work. Shortly afterwards he was transferred to the South Párasnáth Series; but his health failed completely, and he died on his voyage home.

The party was thus in fact no stronger than during the previous season, and the persistent opposition of the inhabitants in the Native States, was a source of great hindrance and anxiety; but the results of this season's work proved nevertheless very much more favourable than the preceding or many succeeding seasons, and appear to reflect no little credit on Lieutenant Macdonald and his assistants.

Lieutenant Macdonald took the field about the middle of October 1833, and found that Dhandkúa (III), the terminal station of the previous season, had been destroyed during the recess; this necessitated the remeasurement of the angles thereat, as well as at Patna (I) and Dargawa (II). These were completed by the 18th November, after which the new stations were visited in the following order:—Andhiári (IV), Gwáli (V), Kathera (VI) a remarkable Bundela stronghold, Bhitári (VII) first visit, Algi (VIII) first visit, Bhitári (VII) second visit, Daryapur (IX) first visit, Maharájpur (X), Karaia (XII), Narwar (XI), Algi (VIII) second visit, Daryapur (IX) second visit, Majhár (XIV) and Ráepur (XIII), by the 30th April 1834. No further observations could be made throughout the month of May owing to the hazy weather, and the season's work closed on the side Ráepur (XIII)—Majhár (XIV), on the 1st of June, when the party marched into recess quarters at Agra where it arrived on the 30th.

In all, twelve new principal triangles had been measured, extending the Series to a point near Gwalior, distant 140 miles north of its origin.

The secondary triangulation accomplished this season was considerable, the points fixed being numerous and fairly well spread over the country traversed, including the important towns of Tehri, the ancient Bundela capital Orchha, its modern successor Jhánsi, the large artificial lake Barwa Ságar, Datia, and Gwalior, besides others of less note.

Some of the chief secondary stations were made to form a minor series by which an independent value was obtained of the side Gwáli-Bhitári, as a check against certain unusually large discrepancies in the observations of some of the previous angles.

In addition to the principal and secondary triangulation accomplished, the preliminary selection of the stations in advance was carried to a distance of 60 miles, well into the plains across the Chambal and Jumna rivers, rendering this season's out-turn of work, notwithstanding many drawbacks and hindrances, one of the most successful noticed in this account.

At the commencement of the Budhon Series, the Surveyor General had directed that a connection should be made, as soon as it could be done without going out of the way, with the Great Arc Series adjacent, recently laid out by Mr. Rossenrode but not yet finally observed with the great theodolite.

The first opportunity of carrying out this connection occurred between Jhánsi and Gwalior, where the Great Arc Series approaches the Budhon Series in the secondary hill stations of Ladára and Karaia, and the principal station on the Ráepur hill, the first of which is visible from Algi (VIII), the second from Ráepur (XIII), and both first and second from Maharájpur (X). Lieutenant Macdonald therefore, occupied the sites of the two Great Arc Series secondary stations of Ladára and Karaia as principal stations, rebuilding the platforms, which had been destroyed by the inhabitants from superstitious motives; but he built a fresh principal station on the Ráepur hill, because the Great Arc Series station thereat could not be observed from the Budhon Series side owing to a small temple that occupied the peak of the hill and precluded the establishment of a common station suitable for both series. Thus a hexagonal figure was formed round Maharájpur (X), and, after measuring the angles, Lieutenant Macdonald reported that he had effected a connection with the Great Arc Series on the side Narwar (XI)—Karaia (XII), Narwar being identical with Ladára h.s. of the Great Arc. These two stations being only secondary points this connection could not be accepted. The three prin-



principal stations of the Great Arc Series, Shergarh, Dhobái, and Ráepur, although they are near to Narwar, Karaia and Ráepur of the Budhon Series, respectively, are in reality different points, and in fact no proper connection was effected. Subsequently however in 1877, the Surveyor General, then Colonel J. T. Walker, R.E., caused a more exact connection to be made between the two principal stations on the Ráepur hill, which were only about 41 feet apart, the temple above mentioned being on the summit of the peak, between them. The details of this connection will be found at page 73—J. of Volume VII of the *Account of the Operations of the Great Trigonometrical Survey of India*.

The Budhon Series had now been carried for one-third of its entire length in two seasons, to the northern limit of the hilly tract in which it began, and the provision of towers or artificial elevations, to carry the Series across the plain country to the north, became indispensable. The Surveyor General had already applied to the Government to sanction the erection of high

3rd Season 1834-35.

PERSONNEL.

Lieut. R. Macdonald, 1st Assistant.  
Mr. W. N. James, Principal Sub-Assistant.  
„ J. H. Scully, 3rd Class „  
„ R. Loane, „ „

towers for the purpose, like those being built by the Public Works Department for the Great Arc Series, which had been sanctioned during the year 1833. Those towers however promised to be so expensive that the Government hesitated to sanction any more for the time, or until their precise cost was known, and put forward a memorandum by the Hon'ble Colonel Morrison suggesting the adoption of a reflecting circle and a portable wooden mast, in place of a big theodolite and a masonry tower. The Surveyor General could not accept this suggestion, but proposed the construction of a lofty central pier of masonry for the instrument and signals to stand on, supplemented by a scaffolding with a stage for the observatory, the cost of which he estimated at Rs. 140 to Rs. 270; and if this should prove too costly, then he believed that a mast, such as he himself had recently used for the approximate Series of the Great Arc, would answer. He did not think such costly towers as those just erected for the Great Arc necessary, and pointed out the excessive depth given to their foundations by the Public Works Department, by whose officers they were built. Finally he expressed a hope that the Survey Officers should not be required to build their own towers or supervise the expenditure of large sums of public money, having already as much to attend to in their own proper professional line as they could well do. This representation however seems to have produced little or no effect, for we find the surveyors generally from that time forwards building their own towers as best they could, in a more modest but sufficiently effective way; and, notwithstanding some failures, this arrangement has probably proved the most economical.

Meanwhile, pending the settlement of the question as to what kind of tower stations should be adopted, Lieutenant Macdonald took the field on the 1st October 1834, and having taken extra precautions for the preservation of the two terminal stations observed at during the previous season—Ráepur (XIII) and Majhár (XIV)—proceeded by direction of the Surveyor General to select the stations in advance by the “ray trace” system, using small theodolites and perambulators. Much skill and judgment is necessary in carrying out this method, and some time was spent in acquiring the requisite accuracy; in short, a good deal of the work had to be revised. Moreover, progress was retarded by sickness, the services of the

principal Sub-Assistant Mr. James being lost through this cause for nearly three months of the field season. The principal station sites were finally selected across the Doáb as far as the Ganges, and the preliminary selection pushed on into the districts of Budaun and Moradabad beyond, before the party returned to recess quarters at Agra early in June.

No observing of principal angles was done this season, but the approximate series was completed for a distance of 100 miles, as far north as the Ganges, by 12 stations forming a single series of symmetrical triangles, and operations were in progress for a considerable distance beyond.

Lieutenant Macdonald himself was obliged by ill health to quit the field in April, and suffered so much from jungle fever during the ensuing recess that he applied to be relieved of his charge in September, and obtained sick leave. Unhappily he did not recover, but died before the end of the year. He was succeeded by Lieutenant E. L. Ommanney, of the Bengal Engineers, who had been appointed to the party in May to learn the practical duties of the Trigonometrical Survey, he having hitherto been employed on a survey of the Brahmaputra river. He joined the Budhon Series at Agra on the 13th June.

Mr. James was transferred to the Great Arc and his place not filled up until 1st March

4th Season 1835-36.

PERSONNEL.

Lieut. E. L. Ommanney, Bengal Engineers, 2nd Assistant.

Mr. J. H. Scully, 2nd Class Sub-Assistant.

1836, when Mr. J. Olliver, Chief Civil Assistant, joined, and the transfer of Mr. Scully also to the Great Arc towards the end of this season left the Series without any of its original staff. Lieutenant Ommanney took the field on

the 8th November 1835, and having received no sanction as yet for the erection of the towers, proceeded at once to run trial lines along the rays between the selected station sites, to ascertain that no serious obstacle existed in them which could not be readily removed, and he was engaged in this work until March 1836. But hitherto no rays were actually cleared owing to Lieutenant Ommanney's inexperience and to the refusal of the inhabitants to allow trees to be cut down.

The Government had recently (April 1835) considered the subject of ray clearing, and had directed that equitable compensation should be given in all cases of injury to the owners; and to enable a just valuation to be speedily made in the case of reculant proprietors, the civil authorities were ordered to direct the personal attendance of the *tahsildár* or *peshkár* (local subordinate Revenue Officers) at the spot, when called upon by the Survey Officers. At the same time the Survey Officers were enjoined to use every means to avoid bringing any highly prized or sacred tree in the ray passing from one station to another.

The latter part of this season was spent in clearing the rays between the stations in the plains, and in determining the height of the towers of observation which would inevitably be required to command them. Approximate angles were observed from the top of masts erected for the purpose, and before the close of the field season this work had been completed as far as Pondri (XXIV) in the middle of the Doáb.

In the case of the two first stations in the plain country—Gúrmi T.S. (XVII) and Bhind S. (XVIII)—the forts at these places offered suitable sites for stations, in the one case on a high bastion, and in the other on the gateway tower, on which during this season stations were built.

The final selection of stations forming a single series of symmetrical angles was extended as far as Moradabad in Lat.  $29^{\circ}$ , but this advanced part of the approximate series north of the Ganges was afterwards abandoned in favour of a double series of smaller triangles.

Several principal stations being now ready, Lieutenant Ommanney commenced the

5th Season 1836-37.

PERSONNEL.

Lieut. E. L. Ommanney, Bengal Engineers, 2nd Assistant.

Mr. J. Olliver, Chief Civil Assistant.

field season of 1836-37 by resuming the final observations which he completed at the undermentioned stations as follows:—at Jhánkri H.S. (XVI) 18th to 27th October 1836, at Majhár H.S. (XIV) 28th to 31st October, at Ráepur H.S. (XIII) 1st to 4th November, at Sánichri (XV) 5th to 8th November, at Gúrmi T.S. (XVII) 11th to 23rd November, and at Bhind S. (XVIII) by 2nd December.

By the time the observing party arrived at Gúrmi T.S. the next forward station on the west flank had been built on the gateway of Panáhat Fort, and the first tower station erected, that at Athgath, had been sufficiently prepared to be observed to.

Lieutenant Ommanney had intended to build solid, conical, mud towers, 22 feet in diameter at base, 15 feet at top, and about 40 feet high, at an estimated cost of from Rs. 200 to Rs. 300 each, but this plan did not meet the Surveyor General's approval; as, *firstly*, the lower centre, or station mark must be on the ground, so as not to be affected by dilapidation of the superstructure; and, *secondly*, the upper centre mark for the frequent adjustment of instrument and signals, must be always plumb over the lower centre, for which purpose the latter must be easily accessible both at first and for subsequent re-examination. Lieutenant Ommanney modified his towers accordingly, having a masonry core pierced with a vertical shaft or central opening 18 inches in diameter, and a horizontal arched passage of masonry at ground level giving light and access to the lower centre or station mark, with an easy spiral slope or ramp winding round the tower and leading to the summit.

The first tower erected, Athgath T.S. (XIX) on the banks of the Chambal, was only built in the first instance to a height of 26 feet, which appears to have been sufficient for the back rays, but afterwards (in 1840) it was rebuilt and raised 10 feet higher.

No further principal observations were taken this season, after those concluded at Bhind S. on the 2nd December, and the rest of the season was spent in building the towers and in taking approximate angles with the aid of masts and scaffolds, as far as the Ganges.

By the close of the season four towers Shergpur, Firozabad, Baragaon and Pondri, were reported as "well advanced" towards completion, and four others, Kilárnáo, Salímpur, Jamálpur and Sankráo, begun. But the earthwork of the Firozabad tower gave way and fell down twice, after it had been built up to a height of 28 feet.

By the end of the fourth season's work the following method of carrying on the principal triangulation in the plains, had been arrived at:—The country having been reconnoitred generally and no hills or artificial elevations suitable for stations met with, a ray trace, traverse or route survey was made in the desired direction for each new station, from which its precise bearing could be computed. A trial line was then run to ascertain that it contained no insurmountable obstacle, after which the line was cleared and the angles between adjacent lines measured by means of a small theodolite raised on the top of a high mast surrounded by a

x—J.

scaffold with a stage for the observer. This measurement was termed the "Approximate Series," a term which in more recent times has been applied to the laying out and preparation of the principal triangulation generally. After this it only remained to build the towers requisite for the final observations with a large theodolite.

The apparently small progress made may be attributed to the want of officers and assistants experienced in the work of triangulating in a plain country and of building high towers in mud without professional aid. But the prime cause of delay was the attempt to maintain almost as large triangles in the plains as in the hills, thus necessitating observations over distances much too great for distinct vision, except in very unusually clear weather.

Final observations were made at 6 principal stations, forming a quadrilateral figure and two single triangles, by which the Series was advanced a meridional distance of 32 miles and reached the south bank of the Chambal river, the boundary between the Gwalior State and the Agra District.

On 31st May 1837 Lieutenant Ommanney resigned his appointment in the Department, and left the Series in charge of Mr. Olliver, Chief Civil Assistant, the only officer remaining with the party.

Before resuming the field work for Season 1837-38, the Surveyor General directed

6th Season 1837-38.

PERSONNEL.

Mr. J. Olliver, Chief Civil Assistant.

" J. Driberg, 3rd Class Sub-Assistant.

Mr. Olliver to reduce the size of the triangles in laying out the Series to the north of the Ganges, and in place of a single series of triangles having 15 to 20 mile sides, to adopt a double series of consecutive polygonal figures,

with sides from 8 to 15 miles in length, by which lower towers would suffice, greatly improved signals would be obtained, and some of the mounds which frequently obstructed the view on the longer rays might be utilized for station sites, whilst the double series would afford an effective check against error. Having regard however to the very backward state of the Series, none of the previous work which would serve, could be abandoned.

Mr. Olliver therefore, in great hopes of completing the section of the Series already laid out to the south of the Ganges, set to work to finish the 8 or 9 towers commenced under Lieutenant Ommanney the previous season. The more advanced of these—Athgath (XIX), Sherpur (XXI), Firozabad (XXII) and Pondri (XXIV)—still required much additional height which however their foundations were not calculated to bear with safety. Firozabad had already fallen twice from this cause. Mr. Olliver therefore pulled them down and rebuilt them afresh upon deeper and more solid foundations. In the case of Firozabad firm soil was only found at a depth of 16 feet below the surface. Having commenced work at all the towers at once to economize time, he was greatly impeded for want of funds; and was constrained to advance sums from his own private purse.

In his half-yearly report, dated 1st March 1838, he said that the progress hitherto had been rapid. The towers at Pondri (XXIV) and Baragaon (XXIII) were finished, Athgath (XIX) 25 feet high, and Kilármáo (XXV) 27 feet; but that Firozabad tower had fallen again after reaching a height of 40 feet.

This was the last of his (Mr. Olliver's) work here, for his services being urgently

required with the new party just formed for the Great Arc (Section  $18^{\circ}$  to  $24^{\circ}$ ) under Lieutenant Waugh, B.E., he suddenly left on the 4th March, having made over charge to the Sub-Assistant, Mr. Driberg. Early next month (April 1838) and before he could have made much progress, Mr. Driberg was ordered to repair with the whole of the Budhon Series party to the Head Quarters of the Surveyor General at Dehra Dún.

During the following season, 1838-39, this party was employed under Lieutenant Renny on the southern section of the Great Arc, and the Budhon Series was thus left in abeyance.

On the 13th November 1839 Lieutenant Renny was put in charge of the Budhon

7th Season 1839-40.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant,  
(*absent on other duty*).  
Mr. C. Murphy, 1st Class Sub-Assistant.  
„ W. Rossenrode, 2nd „ „  
(*with Troughton and Simms' 18-inch Theodolite*  
*No. 2*).

Series in the hope that his experience and ability would conduce to its more rapid progress and early completion. He was directed to re-organize an efficient party from the former Budhon Series party and from that of the Amua Series recently completed by Mr. Murphy, and to resume the operations where Lieutenant Ommanney had left off;

but as his personal assistance was required in the astronomical observations at Kaliána, Mr. Murphy was placed in temporary executive charge.

The work of the season consisted in completing the towers and extending the approximate series. The stations of Bhind (XVIII), Gúrmi (XVII), and the towers at Firozabad (XXII), Baragaon (XXIII) and Pondri (XXIV) were repaired, the last-built tower of Athgath (XIX) raised from 25 to 36 feet, and that of Kilármáo (XXV) from 19 to 44 feet, a new tower at Sherpur (XXI) built, and those at Salámpur (XXVI), Jamálpur (XXVII) and Sankráo (XXVIII) completed, leaving Parauli (XXXI) alone unfinished of all those south of the Ganges.

As soon as Mr. Murphy had set on foot the tower building he proceeded to take up the approximate series to the north of the Ganges as a double series of consecutive polygons with shorter sides, ordered by the Surveyor General in 1837-38, abandoning the sixty miles of approximate series ahead which had been carried as far as Moradabad (Lat.  $29^{\circ}$ ). By March 1840 he had laid out the Sakrora hexagon.

Lieutenant Renny now (March 1840) visited the party and remained long enough to satisfy himself that the work was being carried on in a correct and systematic way.

By the end of this field season the Sakrora tower had been built, and the ground in advance for the next polygon reconnoitred. The towers built under Mr. Murphy north of the Ganges appear to have been solid, as first intended by Lieutenant Ommanney.

Lieutenant Renny being engaged in the astronomical observations at Kaliánpur and

8th Season 1840-41.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant,  
(*absent on other duty*).  
Mr. C. Murphy, 1st Class Sub-Assistant (*in*  
*executive charge*).  
„ O. Mulheran, 2nd „ „  
„ W. Glynn, 3rd „ „

in the measurement of the Bider Base-line, Mr. Murphy remained in executive charge all this season. He began the season's work by selecting a second hexagon about the advanced station of Bánsgopál (XXXV), whilst the towers that had been damaged during the recent rainy season were being restored. One of them, Jamálpur (XXVII),

had fallen, although the precaution had been taken of thatching the towers before the rains

set in. He then hastened southwards to resume the final observing which had been in abeyance four years since Lieutenant Ommanney finished at Bhind S. on the 2nd December 1836.

The final horizontal angles were now taken up and completed at the undermentioned stations as follows:—

|                          |                                               |
|--------------------------|-----------------------------------------------|
| at Firozabad T.S. (XXII) | between 7th and 9th November 1840             |
| „ Panáhat S. (XX)        | „ 10th „ 15th „ „                             |
| „ Athgath T.S. (XIX)     | „ 16th „ 18th „ „                             |
| „ Sherpur „ (XXI)        | „ 19th „ 20th „ „                             |
| „ Baragaon „ (XXIII)     | „ 21st „ 30th „ „                             |
| „ Pondri „ (XXIV)        | } in all December 1840                        |
| „ Kilármáo „ (XXV)       |                                               |
| „ Salímpur „ (XXVI)      | } „ January, February, and to 8th March 1841. |
| „ Jamálpur „ (XXVII)     |                                               |
| „ Sankráo „ (XXVIII)     |                                               |

The towers in advance were not sufficiently advanced for any further observations to be made; but before the end of the field season a third hexagon—that round Sirsa (XL)—was selected and marked by masonry pillars, up to the side Milik (XLIII)—Akbarpur (XLIV), the rays of the Sakrora and Bámsgopál polygons all cleared, and the angles approximately measured with a small theodolite.

No vertical angles were measured this season, and scarcely any secondary triangulation at all accomplished. The vertical angles were not measured, doubtless because the signals on these comparatively long rays in the plains were not visible at the time of least refraction, the only safe time for a single observer to measure them, and they were deferred until the year 1842-43 when a pair of observers with two good instruments became available for the simultaneous reciprocal measurement, requisite at any other time of day. The party returned to recess quarters at Dehra Dún on the 4th June 1841.

The approximate series having now been brought up from the south to within 50

9th Season 1841-42.  
 PERSONNEL.  
 Lieut. T. Renny, Bengal Engineers, 1st Assistant.  
*(absent on other duty).*  
 Mr. C. Murphy, 1st Class Sub-Assistant, *(in executive charge).*  
 Mr. O. Mulheran, 2nd „ „  
 „ W. Glynn, 3rd „ „

miles of the out-lying hills of the Sub-Himalayas about Hardwár (Haridwár), Mr. Murphy took the field in the middle of October 1841 at the north end, as being nearest to Dehra Dún, and proceeded to lay out the figures by which the junction with the Great Arc Series was to be effected.

Starting from the stations of Sheopuri T.S., Godhna T.S., and Chándípahár H.S., of the Great Arc, he selected Mahesari T.S., (now also belonging to the Great Arc) as the centre of a very irregular hexagonal figure, the north and north-east stations being on hills and one of them (Mábegarh) common to this and to the N.E. Longitudinal Series. Two more stations were then selected to form a pentagonal figure about Sarkára T.S. (XLV) by which the entire plan of the Series was completed about the end of February 1842. The rays

of these two polygons having been cleared at the same time, and the necessary tower stations built to the required height (16 to 20 feet), there remained only a few rays in the Sirsa hexagon to clear, and the towers to build or complete in the southern polygons before having all ready for the final measurement of the angles.

But it required the utmost exertions of all concerned to finish the towers by the beginning of July, when the party returned to recess quarters, having accomplished a very laborious season's work successfully.

## 10th Season 1842-43.

## PERSONNEL.

Budhon Series Party (1). { Lieut. T. Renny, B.E., 1st Assistant.  
Mr. C. Murphy, 1st Class Sub-Assistant.  
" O. Mulheran, 2nd " "  
" W. Glynn, 3rd " "

(1). Equipped with Troughton and Simms' 18-inch theodolite No. 2 and two 12-inch theodolites by Troughton and Simms for simultaneous reciprocal verticals.

Extra Party (2). { Mr. W. N. James, 1st Principal Sub-Assistant.  
" N. Parsick, Sub-Assistant.  
" T. Olliver, "

(2). With probably an 18-inch theodolite by Cary.

Extra Party (3). { Mr. G. Logan, 1st Assistant.  
" G. Terry, Sub-Assistant.  
" A. Olliver, "

(3). With 15-inch theodolite by Cary.

In view of the large amount of observing to be done, no astronomical observations for azimuth having yet been taken since the Series was begun, and no vertical angles observed since it entered the plains across the Chambal, (owing to want of visibility at time of minimum refraction), and to ensure its completion, the Surveyor General appointed two extra observing parties, and divided the work into three sections to be taken up simultaneously by the three parties as follows:—

In Lieutenant Renny's absence on military duty as Field Engineer to the Army of Reserve assembling at Ferozpur, Mr. Murphy with the main party was to complete the horizontal angles of the southern (Sakrora) polygon, and the unobserved triangle to the south of it, the whole of the verticals, and two Azimuths.

A third Azimuth was to be observed by one (or other) of the two extra parties.

Mr. James with two Sub-Assistants was to observe the horizontal angles of the next two polygons, the Bānsgopāl and Sirsa hexagons, measuring the vertical angles also in the afternoon whenever practicable.

Mr. Logan with two Sub-Assistants was to observe the angles of the two northernmost polygons, the Sarkāra pentagon and the Mahesari hexagon.

Accordingly Mr. Murphy took the field on the 15th October 1842 and reached Firozabad his first station for observation on the 11th November. Here in conjunction with his sub-assistants he measured three of the four vertical angles by simultaneous reciprocal observations, after which he proceeded to Panáhat and Gúrmī, where by the 10th December he had completed a set of azimuth observations (to  $\epsilon$  Ursæ Minoris at both E. and W. elongations), besides the requisite vertical angles.

He then visited in succession the stations of Blind (XVIII), Sherpur (XXI), Baragaon



(XXIII), Pondri (XXIV), Kilármáo (XXV), Jamálpur (XXVII), and Sarsotha (XXIX), where by the 25th January 1843 he had completed the vertical angles on all but seven rays of the single portion of the Series to the south, and by the middle of February, the horizontal angles at Jamálpur (XXVII), Sarsotha (XXIX), Kariámái (XXXII), Sakrora (XXX), Mehtra (XXXIV), and Rajauli (XXXIII) of the Sakrora hexagon were also finished besides vertical observations on three rays of this figure. On the 10th February Lieutenant Renny rejoined and assumed charge at Sankráo T.S. (XXVIII), where he at once took up the final observing and by the 25th had completed the second Azimuth (using 29 *Camelopardalis* Hev. at both elongations), the necessary horizontal and the simultaneous reciprocal verticals.

Lieutenant Renny then completed the horizontal and vertical angles remaining to be observed in the following order:— at Parauli (XXXI) by the 4th March, Chandaupur (XXXVI) by the 14th, whilst Messrs. Murphy and Glynn with the two 12-inch theodolites co-operated in observing the simultaneous reciprocal verticals. The main party now returned to Kilármáo, Pondri, and Kariámái, completing or re-observing the angles which Mr. Murphy had been unable to obtain satisfactorily on his first visit, all which were made good by the 9th April. Having completed the work assigned to the main party on the southern section, Lieutenant Renny marched northwards re-observing or supplementing the observations which were still wanting to complete the Series.

A good half of the vertical angles were, practically speaking, simultaneous, *i.e.* taken at both ends of a ray within five minutes of one another, but some only within 15 minutes, whilst in a few cases the observations of the vertical angle at one end of a ray were taken at a widely different time from the corresponding observations at the other. The verticals had necessarily to be observed at any time of day when the signals were visible, with the natural result of giving great variations in the deduced co-efficient of refraction.

Meanwhile the two extra parties under Messrs. Logan and James leaving Head Quarters, Dehra Dún, on 2nd November reached Agra on the 26th, and having completed their equipment proceeded to the section of the field work allotted to them.

Mr. James reached his first station Rajauli (XXXIII) on the 23rd December 1842, and completed his two horizontal angles there on the 30th. The two next angles occupied him at Mehtra (XXXIV) from the 4th to the 21st January 1843. He next measured the six angles at Bánsopál (XXXV) between the 24th January and 4th February, after which he proceeded to Sirsa (XL) where he was employed nearly a whole month, from 7th February till 3rd March, observing an azimuth and completing five of the six angles. He observed 29 *Camelopardalis* Hev. at both elongations, the same star that Lieutenant Renny was simultaneously observing at Sankráo. He next visited Bhatauli (XLII), near Moradabad town which he observed to, and whilst here his party was inspected by the Surveyor General. The four angles at Atora T.S. (XXXIX) occupied from the 14th to 26th March, and the two at Barauli (XXXVII) till after the middle of April. He then returned to Sirsa and was occupied from 20th April till the 3rd May in making good the angle which he had been unable to complete during his former long visit. The rest of the observing allotted to him having been completed by the other two parties, Mr. James helped to complete the vertical angles for a few days before returning to recess quarters.

Mr. Logan on the northern section of the work was rather more fortunate. He completed the angles at his first station Akbarpur (XLIV) by the 25th December 1842, then those at Nandi (XLVII), and three of the five angles at Sarkára (XLV) by the 10th January 1843; Harpálsid H. S. (XLVIII) was next observed at, and then Mahesari T.S., where however a portion of the angles had to be left unmeasured, by the 3rd of February. The Surveyor General visited and inspected the party whilst at Mahesari. The angles at Chándípahár near Hardwár, Godhna and Sheopuri, the stations of the Great Arc, were completed by the 16th February, after which the missing angles at Mahesari were observed, and all the four at Haldaur (XLVI), by 6th March. The missing angles at Sarkára (XLV) were next observed, and the party then proceeded to Milik (XLIII) where the measurement of the 4 angles occupied from the 12th to the 25th March, when the northernmost section allotted to Mr. Logan was finished, but Mr. James's work being backward, he continued his southward progress, completing the angles at Lút (XLI) and Kandarki (XXXVIII) by the end of the month.

Seeing Mr. James to be now in a fair way to complete the angles at the centre and east flank of the Series, and those on the west flank and to the southward being finished, Mr. Logan proceeded to co-operate with Lieutenant Renny in observing the remaining vertical angles all of which were completed by the middle of May, when all three parties marched to Head Quarters at Dehra Dún.

Three other angles were measured at the northern extremity of this season's work and in connection with the triangulation above described, by Captain J. S. Du'Vernet, when commencing the "North Connecting Series" afterwards named the North-East Longitudinal Series, in October and November 1842; but two of them were eventually superseded by re-measurements made by Lieutenant Renny eight years later, with superior instruments, which two are now incorporated with the North-East Longitudinal Series.

The calculations of the triangulation of this Series having been carried up from the side of origin, Budhon-Tinsmál of the Calcutta Longitudinal Series, to the terminal side, Sheopuri-Mahesari of the Great Arc, the following discrepancies were met with between the original values of the length and azimuth of the terminal side above named and those of the latitude and longitude of the terminal station Mahesari, and the values of the same as derived from the Great Arc after the reduction of the North-West Quadrilateral.

|                          |                                              |
|--------------------------|----------------------------------------------|
| In Logarithm of the side | + 0.000,0302,6 = 4.5 inches per mile nearly. |
| „ Latitude               | + 1".002                                     |
| „ Longitude              | + 0.307                                      |
| „ Azimuth                | + 8.284                                      |

These discrepancies were treated as errors in the Budhon Series and were dispersed by the method of least squares, as described in Part I of Volume VII of the *Account of the Operations*, &c.

Soon afterwards, the two principal stations at Ráepur of this Series and the Great Arc which are only about 41 feet apart, (see page vii—J. above), were connected in the manner described at page 73—J. of Vol. VII quoted above.

The following discrepancies between the first corrected Budhon Series values, and the adopted values of the Great Arc were then met with at Ráepur H.S. (XIII) belonging to the Budhon Series :—

|             |         |
|-------------|---------|
| In Latitude | + 0".10 |
| „ Longitude | — 0'.02 |

These discrepancies were treated as errors in the first corrected results of the Budhon Series, and they were dispersed over the whole triangulation by introducing two additional equations of condition for satisfaction, the four primary equations which were required to dispose of the terminal errors being simultaneously maintained. For full description of the procedure see Part I of Vol. VII of the *Account of the Operations, &c.*

The trigonometrical heights above sea-level were checked at several stations (see page 63—J.) by the spirit leveling operations of the Trigonometrical and Revenue Surveys, and the errors thus disclosed, together with those of the terminal side Sheopuri-Mahesari, dispersed over the Series in four sections indicated at pages 37 and 38 of Part I of the above named volume.

In the section Budhon-Tinsmál to Firozabad-Baragaon, a distance of about 212 miles, the cumulative error was + 12 feet nearly. In the next section ending at Mehtra-Bánsopál, a distance of about 88 miles, it was as much as — 17 feet. In the next section ending at Bhatauli-Sirsa-Milik, a distance of about 34 miles, it was less than 1 foot; and in the last section, a distance of about 50 miles, it was nearly — 7 feet. For further details see pages 37 and 38 quoted above.

### *Secondary Triangulation.*

As long as the Series lay in hilly country under Lieutenant Macdonald, the number of secondary stations, landmarks, and places of importance or interest fixed, was very considerable, including the towns of Tehri, Orchha, Jhánsi, Datia, Narwar, Gwalior, Barwa Sagar, and many hill forts, temples &c.

But after entering the plains in lat. 26° 30' where no view was to be had except by clearing the rays of trees and building high towers, scarcely any secondary points could be fixed without making special arrangements, and the whole strength of the establishment was barely sufficient for the principal triangulation until its close. Nevertheless, Shikohabad, Jalesar, Moradabad, Bijnor, and Kankhal were fixed.

*Compiled from the very extensive and complete materials collected by Mr. Charles Wood.*

May 1881.

B. R. BRANFILL.

## BUDHON MERIDIONAL SERIES.

## ALPHABETICAL LIST OF PRINCIPAL STATIONS.

|                                    |          |                                      |         |
|------------------------------------|----------|--------------------------------------|---------|
| Akbarpur . . . . .                 | XLIV.    | Kilármáo . . . . .                   | XXV.    |
| Algi . . . . .                     | VIII.    | Lút . . . . .                        | XLI.    |
| Andhiári . . . . .                 | IV.      | Mábegarh . . . . .                   | I.      |
| Athgath . . . . .                  | XIX.     | (of North-East Longitudinal Series). |         |
| Atora . . . . .                    | XXXIX.   | Maharájpur . . . . .                 | X.      |
| Bámsgopál . . . . .                | XXXV.    | Mahesari . . . . .                   | LII.    |
| Baragaon . . . . .                 | XXIII.   | (of Great Arc Meridional Series).    |         |
| Barauli . . . . .                  | XXXVII.  | Majhár . . . . .                     | XIV.    |
| Bhatauli . . . . .                 | XLII.    | Mehtra . . . . .                     | XXXIV.  |
| Bhind . . . . .                    | XVIII.   | Milik . . . . .                      | XLIII.  |
| Bhitári . . . . .                  | VII.     | Nandi . . . . .                      | XLVII.  |
| Budhon . . . . .                   | III.     | Narwar . . . . .                     | XI.     |
| (of Calcutta Longitudinal Series). |          | Panáhat . . . . .                    | XX.     |
| Chandanpur . . . . .               | XXXVI.   | Parauli . . . . .                    | XXXI.   |
| Dargawa . . . . .                  | II.      | Patna . . . . .                      | I.      |
| Daryapur . . . . .                 | IX.      | Pondri . . . . .                     | XXIV.   |
| Dhandkúa . . . . .                 | III.     | Ráepur . . . . .                     | XIII.   |
| Firozabad . . . . .                | XXII.    | Rajauli . . . . .                    | XXXIII. |
| Gúrmi . . . . .                    | XVII.    | Sakrora . . . . .                    | XXX.    |
| Gwáli . . . . .                    | V.       | Salámpur . . . . .                   | XXVI.   |
| Haldaur . . . . .                  | XLVI.    | Sánichri . . . . .                   | XV.     |
| Harpálsid . . . . .                | XLVIII.  | Sankráo . . . . .                    | XXVIII. |
| Jamálpur . . . . .                 | XXVII.   | Sarkára . . . . .                    | XLV.    |
| Jhánkri . . . . .                  | XVI.     | Sarsotha . . . . .                   | XXIX.   |
| Kandarki . . . . .                 | XXXVIII. | Sheopuri . . . . .                   | XLVIII. |
| Karaia . . . . .                   | XII.     | (of Great Arc Meridional Series).    |         |
| Kariámái . . . . .                 | XXXII.   | Sherpur . . . . .                    | XXI.    |
| Kathera . . . . .                  | VI.      | Sirsa . . . . .                      | XL.     |
|                                    |          | Tinsmál . . . . .                    | VII.    |
|                                    |          | (of Calcutta Longitudinal Series).   |         |

## BUDHON MERIDIONAL SERIES.

## NUMERICAL LIST OF PRINCIPAL STATIONS.

|       |   |   |   |                                    |         |   |   |   |   |                                      |
|-------|---|---|---|------------------------------------|---------|---|---|---|---|--------------------------------------|
| III   | . | . | . | Budhon.                            | XXVI    | . | . | . | . | Salimpur.                            |
|       | . | . | . | (of Calcutta Longitudinal Series). |         | . | . | . | . |                                      |
| VII   | . | . | . | Tinsmál.                           | XXVII   | . | . | . | . | Jamálpur.                            |
|       | . | . | . | (of Calcutta Longitudinal Series). |         | . | . | . | . |                                      |
| I     | . | . | . | Patna.                             | XXVIII  | . | . | . | . | Sankrá.                              |
| II    | . | . | . | Dargawa.                           | XXIX    | . | . | . | . | Sarsotha.                            |
| III   | . | . | . | Dhandkúa.                          | XXX     | . | . | . | . | Sakrota.                             |
| IV    | . | . | . | Andhiári.                          | XXXI    | . | . | . | . | Parauli.                             |
| V     | . | . | . | Gwáli.                             | XXXII   | . | . | . | . | Kariámái.                            |
| VI    | . | . | . | Kathera.                           | XXXIII  | . | . | . | . | Rajauli.                             |
| VII   | . | . | . | Bhitári.                           | XXXIV   | . | . | . | . | Mehtra.                              |
| VIII  | . | . | . | Algi.                              | XXXV    | . | . | . | . | BánsGOPál.                           |
| IX    | . | . | . | Daryapur.                          | XXXVI   | . | . | . | . | Chandanpur.                          |
| X     | . | . | . | Maharájpur.                        | XXXVII  | . | . | . | . | Barauli.                             |
| XI    | . | . | . | Narwar.                            | XXXVIII | . | . | . | . | Kandarki.                            |
| XII   | . | . | . | Karaia.                            | XXXIX   | . | . | . | . | Atora.                               |
| XIII  | . | . | . | Ráepur.                            | XL      | . | . | . | . | Sirsa.                               |
| XIV   | . | . | . | Majhár.                            | XLI     | . | . | . | . | Lát.                                 |
| XV    | . | . | . | Sánichri.                          | XLII    | . | . | . | . | Bhatauli.                            |
| XVI   | . | . | . | Jhánkri.                           | XLIII   | . | . | . | . | Milik.                               |
| XVII  | . | . | . | Gúrmi.                             | XLIV    | . | . | . | . | Akbarpur.                            |
| XVIII | . | . | . | Bhind.                             | XLV     | . | . | . | . | Sarkára.                             |
| XIX   | . | . | . | Athgath.                           | XLVI    | . | . | . | . | Haldaur.                             |
| XX    | . | . | . | Panáhat.                           | XLVII   | . | . | . | . | Nandi.                               |
| XXI   | . | . | . | Sherpur.                           | XLVIII  | . | . | . | . | Harpálsid.                           |
| XXII  | . | . | . | Firozabad.                         | I       | . | . | . | . | Mábegarh.                            |
| XXIII | . | . | . | Baragaon.                          | XLVIII  | . | . | . | . | (of North-East Longitudinal Series). |
| XXIV  | . | . | . | Pondri.                            |         | . | . | . | . | Sheopuri.                            |
| XXV   | . | . | . | Kilármáo.                          | LII     | . | . | . | . | (of Great Arc Meridional Series).    |
|       | . | . | . |                                    |         | . | . | . | . | Mahesari.                            |
|       | . | . | . |                                    |         | . | . | . | . | (of Great Arc Meridional Series).    |

## BUDHON MERIDIONAL SERIES.

### DESCRIPTION OF PRINCIPAL STATIONS.



Of the 48 Principal Stations composing this Series, the first 16 are on hills occupying the southern half of its extent. They are low solid platforms, either level with the rock, marked in such case *in situ*, or raised above it. Where the platform is thus raised there is (presumably) a rock-mark or stone, above which one or more mark-stones, with the usual engraved circle and dot, are inserted in the platform, the uppermost even with its surface. When the Series entered the plains, artificial elevations had to be constructed; the necessity for constructing these was sometimes avoided, either in part or entirely, by taking advantage of existing buildings and bastions of forts with which the country abounded. The special erections consisted at first, generally speaking, of *kacha* towers, 20 to 30 feet square at base, having about 7 feet square in the interior made of *paka* brick laid in mud cement, with a central hollow about  $1\frac{1}{2}$  feet in diameter running vertically through it, and a mark-stone laid in masonry at about the level of the ground: an arched doorway and passage led to the mark-stone for convenience in plumbing; and a staircase exterior to the tower gave access to the top. Subsequently, the *paka* pillar instead of being perforated was made solid, of about 42 inches diameter at top and having one or more mark-stones built vertically within it: in certain instances no definite information is forthcoming as to the number of marks which were built into the pillar; in these cases no allusion is made in the descriptions to any mark save that at the summit.

The following descriptions have been compiled from those given in the original MS. General Report and other original records of this Series, supplemented in respect to the neighboring villages, by information obtained from the Revenue Survey, Topographical Survey, and other reliable maps of the country traversed. The orthography is in literal agreement with the Gazetted List for the N.W. Provinces, wherever the locality is identified; and conforms to the spirit of the orders of Government on the subject, as worked out in this and other provincial lists, where there is no clear literal authority. The information as to the local sub-divisions in which the several stations occur has been derived where practicable from the Annual Reports received from the civil authorities to whose charge the stations have been committed.

III.—(*Of the Calcutta Longitudinal Series*). Budhon Hill Station, lat.  $24^{\circ} 5'$ , long.  $78^{\circ} 34'$ —observed at in 1826, 1833 and 1864—is situated immediately above the village of that name: thána Barodia, tahsil Kurai, pargana Banda, district Saugor.

The pillar is solid and contains three marks, the two upper respectively 9' and 4 feet above the lowest. The station of 1826 was re-visited in 1833 for the purpose of originating the Budhon Meridional Series, but no alteration in its construction appears to have been made. When again visited in 1864 the mark-stones were found untampered with, the upper being accurately plumbed over the lower, which was adopted for the new station. The bearings and distances of surrounding villages are:—Jáman Kheri 1.5 miles N.W.; Burruho 1.5 miles N.; Dubri 1.3 miles E.N.E.; Khirea 1.1 miles E.S.E.; and Kanera 2 miles due S.

VII.—(*Of the Calcutta Longitudinal Series*). Tinsmál Hill Station, lat.  $24^{\circ} 7'$ , long.  $79^{\circ} 2'$ —observed at in 1826, 1833, 1834 and 1864—is situated on the top of a very conspicuous hill about three quarters of a mile S. by E. of the village of Tinsua from which it is approached: thána, tahsíl and pargana Banda, district Saugor.

The pillar is solid and has three marks, one engraved on the rock *in situ* and the others 3·5 and 8·5 feet above it respectively. The station of 1826 was re-visited in 1833 for the purpose of originating the Budhon Meridional Series, when its height was increased by 8·5 feet. It was again visited in 1834 to originate the Rangir Meridional Series, but no further alteration in its construction appears to have been made. On visiting it in 1864 the upper mark was found displaced and the position of the lower was adopted for the new station. The bearings and distances of other surrounding villages are:—Dalpatpur, from which a road leads up to the station, 1·5 miles N.E.; Lamnau 1·3 miles towards the W.; and the deserted village of Tinsi 0·8 mile S.S.E.

I. Patna Hill Station, lat.  $24^{\circ} 20'$ , long.  $78^{\circ} 40'$ —observed at in 1833—is situated on a sandstone hill, standing on an elevated plateau, on the N. E. face of which is the large village of Patna distant half a mile from the station: tahsíl Mahroni, pargana Máraura Nárlhat, district Lalitpur.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of other surrounding villages are:—Dongraa Kalán 2·2 miles N. by W.; Chanaura 2·2 miles N.E. by N.; and Baraudia 2·4 miles due E.

II. Dargawa Hill Station, lat.  $24^{\circ} 37'$ , long.  $79^{\circ} 4'$ —observed at in 1833—is situated on a steep rocky ridge, running nearly north and south, at the northern foot of which is the village of Dargawa distant 0·4 mile from the station: pargana Baldeogarh of the Orchha or Tehri state.

The station is marked on the rock *in situ*. The bearings and distances of other surrounding villages are:—Parra 0·3 mile N.W.; Rasoi 1 mile N.N.W.; Bhadaura 1·4 miles S.S.W.; and Magarkhera 1·6 miles E.S.E.

III. Dhandkúa Hill Station, lat.  $24^{\circ} 48'$ , long.  $78^{\circ} 46'$ —observed at in 1833 and 1834—is situated on a detached hill, which is deemed sacred by the inhabitants of those parts, and at the northern foot of which at a distance of 500 feet is the village of Dhandkúa: tahsíl Mahroni, pargana Bánpur, distret Lalitpur.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of other surrounding villages are:—Pura 0·8 mile N.W. by N.; Billahta 0·8 mile S.S.W.; and Khakhron 2·3 miles S.E. by E.

IV. Andhiári Hill Station, lat.  $24^{\circ} 41'$ , long.  $78^{\circ} 16'$ —observed at in 1833—is situated on the highest point of the sandstone range of that name, and about 100 yards north of a remarkable cave: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Sirsod 0·4 mile N. by W.; Jamursa 2·1 miles S.E.; and Larheri 2 miles S.W.

V. Gwáli Hill Station, lat.  $25^{\circ} 10'$ , long.  $78^{\circ} 28'$ —observed at in 1833—is situated on a rocky ridge running north and south, and takes its name from a small village which is distant about  $\frac{1}{3}$  of a mile to the E.: pargana Jhánsi, district Jhánsi.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Bijpur 1·2 miles N.E.; Lakhanpur 1·3 miles S.E. by S.; and Busai 1·6 miles S.W. by S.

VI. Kathera Hill Station, lat.  $25^{\circ} 14'$ , long.  $79^{\circ} 0'$ —observed at in 1834—is situated on a high and steep hill which was formerly used as a stronghold: pargana Mau, district Jhánsi.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Laraun 1 mile S.W.; Katehra Muáf 1·6 miles W.; and Hanspura 0·4 mile E. by N.

VII. Bhitári Hill Station, lat.  $25^{\circ} 28'$ , long.  $78^{\circ} 47'$ —observed at in 1834—is situated on a hill on the E. bank of the Betwa river, and distant 0·4 mile S.S.W. of the village after which it is named. The high road from Jhánsi to Garotha passes about a mile north of the station: in the Orchha or Tehri state.

The station is marked on a large block of quartz around which a platform has been built. The bearings and distances of neighboring villages are:—Tiletha 1·1 miles S. by W.; Bagat, on the left bank of the Dangrai Nádí, 2·8 miles E. by S.

VIII. Algi Hill Station, lat.  $25^{\circ} 30'$ , long.  $78^{\circ} 24'$ —observed at in 1834—is situated on a hill about 3 miles north of the hill fort and large village of Dinara: in the Gwalior state.

The station is marked on the rock *in situ* around which a platform has been built. The bearings and distances of surrounding villages are:—Khirk 1·2 miles N.N.W.; Algi 1·1 miles S.W.; and Guraira Ráj Orchha 0·5 mile due S.



IX. Daryapur Hill Station, lat.  $25^{\circ} 42'$ , long.  $78^{\circ} 41'$ —observed at in 1834—is built on the site of a dilapidated fort surmounting a low isolated hill, on the southern brow of which is the village of Daryapur: tahsíl and pargana Datiya of the Datiya state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Bhúla 0.9 mile S.; Dúrsara 1.3 miles N.E.; and Karkhara 1.6 miles N.N.W.

X. Maharájpur Hill Station, lat.  $25^{\circ} 54'$ , long.  $78^{\circ} 17'$ —observed at in 1834—is situated on a hill rising immediately above the village of Maharájpur and surrounded by several lower hills: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Rajare and Lailiapura 0.8 mile towards the W. by S.; Kanwai 1.5 miles N.N.E.; and Chetauni 1.8 miles S.E. by S.

XI. Narwar Hill Station, lat.  $25^{\circ} 37'$ , long.  $77^{\circ} 58'$ —observed at in 1834—is situated on the N.E. extremity of a sandstone hill on which, at a few feet to the E.S.E., the secondary station Ladára h.s. (of the Great Arc Meridional Series, Section  $24^{\circ}$  to  $30^{\circ}$ ) is built: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding places are:—the large town and fort of Narwar about  $1\frac{1}{2}$  miles N.W. by N.; Surkharia village 1.3 miles N.E.; and Shergarh 1.5 miles S. by E.

XII. Karaia Hill Station, lat.  $25^{\circ} 54'$ , long.  $78^{\circ} 3'$ —observed at in 1834—is situated in the centre of an unfinished fort which occupies an eminence of the great sandstone range extending to the vicinity of Gwalior: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Karaia 0.5 mile E.S.E.; Rethaunda 2 miles S. by W.; and Dhobai 1.8 miles N. by E.

NOTE.—*This station is almost certainly identical with the secondary point Karaia h.s. of the Great Arc Meridional Series, Section  $24^{\circ}$  to  $30^{\circ}$ , in the original records of which however it is described as on the W. turret of a well known detached fortified hill on road Gwalior to Sironj; Karaia village lies on the eastern slope: it is marked by a circular platform with a mark-stone, having a ☉ engraved on it.*

XIII. Ráepur Hill Station, lat.  $26^{\circ} 8'$ , long.  $78^{\circ} 7'$ —observed at in 1834 and 1836—is situated on a lofty conical peak of the Vindhyaehal range surmounted by a Hindu temple, on the western side of which Ráepur H.S. of the Great Arc Meridional Series, Section  $24^{\circ}$  to  $30^{\circ}$ , is built. The station commands a good view of the town and fort of Gwalior which lie about  $9\frac{1}{2}$  miles to the N.E.: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of neighboring villages are:—Ráepur  $1\frac{1}{2}$  miles W.S.W.; and Naigaon 1.5 miles S.

XIV. Majhár Hill Station, lat.  $26^{\circ} 6'$ , long.  $78^{\circ} 31'$ —observed at in 1834 and 1836—is situated on the same elevated plateau as Gujara fort from which it is distant about  $1\frac{1}{2}$  miles due north: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of neighboring places are:—Jamrúha fort 2 miles E.N.E.; and Naigamo village 3.1 miles E.S.E.

XV. Sáníchri Hill Station, lat.  $26^{\circ} 24'$ , long.  $78^{\circ} 15'$ —observed at in 1836—is built adjoining some ruins on a sacred hill which is the residence of a *guru* or religious instructor of the Raja, and stands above the ruins of the ancient town of Ainti: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding places are:—Khitore fort 2 miles E. by N.; Burrúli village 1.4 miles N.N.W.; and Parbat village 0.6 mile W.S.W.

XVI. Jhánkri Hill Station, lat.  $26^{\circ} 19'$ , long.  $78^{\circ} 35'$ —observed at in 1836—is situated on a low range of hills which runs nearly north and south, and has a couple of hamlets lying at the foot of the hill on the eastern side: in the Gwalior state.

The pillar is solid, and has a mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Silauli 1.3 miles N.E. by E.; Makata 1.1 miles S.E.; and Chimara 1.9 miles W.S.W.

XVII. Gúrmi Tower Station, lat.  $26^{\circ} 36'$ , long.  $78^{\circ} 33'$ —observed at in 1836 and 1842—is situated

on a bastion at the northern angle of the mud fort attached to the village of Gúrmi which lies between the Sáníchri hills and the Chambal river: in the Gwalior state.

The station consists of a tower of sun-dried bricks and mud cement, raised to a height of 27 feet above the terreplein of the rampart, and having a mark-stone at top and another at bottom. The bearings and distances of surrounding villages are:—Silauli 1·6 miles N.W. by W.; Kaliánpura 1·6 miles S.W. by W.; and Gopálpura 1·4 miles E. by S.

**XVIII.** Bhind Station, lat.  $26^{\circ} 34'$ , long.  $78^{\circ} 50'$ —observed at in 1836 and 1842—is situated on the roof of the gateway in the north face of the masonry fort attached to the large village of Bhind which lies on the plain south of the Chambal river. The station is 34 feet above the level of the interior of the fort: in the Gwalior state.

The station consists of a masonry pillar, 5 feet high and 9 feet square, which carries the usual mark-stone at its upper surface. The bearings and distances of surrounding villages are:—Pura 0·4 mile N. by E.; Khirpura 1·3 miles S. S. W.; Haibatpura 1·8 miles W.; and Kumaroa 1·7 miles N.W. by W.

**XIX.** Athgath Tower Station, lat.  $26^{\circ} 48'$ , long.  $78^{\circ} 45'$ —observed at in 1840 and 1842—is situated amidst the ravines on the north bank of the Chambal river, and close to the northern skirts of the village of Athgath or Hathkanth: tahsíl Panáhat, pargana Hathkanth, district Agra.

The station consists of a tower, 36 feet high and 14 feet square at top, having a central hollow core of masonry: it has a mark-stone at level of ground floor. The bearings and distances of surrounding villages are:—Kiári 1·3 miles W. by S.; Piárapura 1·1 miles N.E.; and Surekhipura 1·3 miles N.E. by E.

**XX.** Panáhat Station, lat.  $26^{\circ} 53'$ , long.  $78^{\circ} 25'$ —observed at in 1840 and 1842—is situated on the roof of a vaulted building (apparently an interior gateway) of the dilapidated masonry fort at the south side of the village of Panáhat: tahsíl and pargana Panáhat, district Agra.

The station mark is elevated 30 feet above the ground at the south side of the building, the walls of which were raised to form a platform around a pillar 3 feet high. The bearings and distances of surrounding villages are:—Biprauli 1·4 miles W.N.W.; Utasana 1·1 miles S.S.E.; and Sikthura 2·5 miles E.

**XXI.** Sherpur Tower Station, lat.  $27^{\circ} 1'$ , long.  $78^{\circ} 42'$ —observed at in 1840 and 1842—is situated on the terreplein of the rampart at the northern corner of an old mud fort standing a short distance east of the village of Sherpur: thána Sarsaganj, tahsíl and pargana Shikohabad, district Mainpuri.

The station consists of a tower of sun-dried bricks and mud cement, 30·8 feet high and 14 feet in diameter at top, having a central hollow core of burnt brick: it has a mark-stone at level of ground floor. The bearings and distances of surrounding villages are:—Madanpur 1 mile N.N.W.; Pandrawan 0·3 mile S. by E.; and Aidálpur 0·3 mile N.E.

**XXII.** Firozabad Tower Station, lat.  $27^{\circ} 9'$ , long.  $78^{\circ} 26'$ —observed at in 1840, 1842 and 1843—is situated on the terreplein of the rampart at the S. E. corner of an old mud fort standing about  $\frac{1}{4}$  mile W. of the town of Firozabad: pargana and tahsíl Firozabad, district Agra.

The station consists of a tower of sun-dried bricks and mud cement, 43·8 feet high and 14 feet square at top, having a central hollow core of burnt brick: it has a mark-stone at 1 foot below the level of the terreplein. The bearings and distances of surrounding places are:—Firozabad station, of the E. I. Railway, 0·3 mile S.S.E.; Rasúlpur village 1·1 miles E.S.E.; Datauji 1·1 miles W.S.W.; and Humáyúnpur 1·2 miles N.W.

**XXIII.** Baragaon Tower Station, lat.  $27^{\circ} 15'$ , long.  $78^{\circ} 45'$ —observed at in 1840, 1842 and 1843—is situated on the crest of a mound distant  $\frac{1}{4}$  mile to the S. E. of the village of Baragaon: thána Jasrána, tahsíl and pargana Mustafabad, district Mainpuri.

The station consists of a tower of sun-dried bricks and mud cement, 45·4 feet high and 14 feet square at top, having a central core of burnt brick: it has a mark-stone at 1 foot below the ground floor. The Etáwáb Branch of the Ganges Canal runs at  $\frac{1}{4}$  mile S. W. of the station; and the bearings and distances of surrounding villages are:—Nahu 1·1 miles N.; Jasrána 2·8 miles S.S.W.; Kuári 2·2 miles S.E.; and Kanehgabi 2·6 miles N.E.

**XXIV.** Pondri Tower Station, lat.  $27^{\circ} 28'$ , long.  $78^{\circ} 27'$ —observed at in 1840 and 1843—is situated on a mound (about 25 feet in height) within the ruins of the mud fort attached to the small village of Pondri: tahsíl and pargana Jalesar, district Agra.

The station consists of a tower of sun-dried bricks and mud cement, 44·3 feet high and 13 feet square at top, having a central hollow core of burnt brick: it has a mark-stone at 1 foot below the ground floor. The bearings and distances of surrounding villages are:—Punhara 1·5 miles W. by N.; Kasua 1·3 miles N.; Khaira Taj 1·2 miles E. by N.; and Mahaki 1·8 miles S.S.W.

XXV. Kilármáo Tower Station, lat.  $27^{\circ} 33'$ , long.  $78^{\circ} 49'$ —observed at in 1840, 1842 and 1843—is situated on the crest of a mound (about 20 feet in height) distant  $\frac{1}{2}$  mile west of the small village of Kilármáo: thána, tahsíl, pargana and district Etah.

The station consists of a tower of sun-dried bricks and mud cement, 44.5 feet high and 14 feet square at top, having a central hollow core of burnt brick: it has a mark-stone at 1 foot below the ground floor. The bearings and distances of surrounding places are:—Etah town 6 miles W.; Nehchalpur village 0.9 mile W.N.W.; Jísukhpur 0.5 mile S.W.; and Murjadpur 0.6 mile N. by W.

XXVI. Salímpur Tower Station, lat.  $27^{\circ} 47'$ , long.  $78^{\circ} 33'$ —observed at in 1841 and 1843—is situated on the crest of a mound (about 20 feet in height) distant 600 yards west of the small village of Salímpur: thána and tahsíl Kásganj, pargana Bilráam, district Etah.

The station consists of a tower of sun-dried bricks and mud cement, 48 feet high and 13 feet square at top, having a central hollow core of burnt brick: it has a mark-stone at 1 foot below the ground floor. The bearings and distances of surrounding villages are:—Badampur 0.9 mile E.S.E.; Narámpur 0.5 mile S.; Kutubpur 1.2 miles N.W.; and Dharampur 1.3 miles N.E. by N.

XXVII. Jamálpur Tower Station, lat.  $27^{\circ} 48'$ , long.  $78^{\circ} 52'$ —observed at in 1841 and 1843—is situated on a mound (about 12 feet in height) within the ruins of a mud fort distant nearly half-a-mile to the N.W. of the small village of Jamálpur: thána Saháwar, tahsíl Kásganj, pargana Saháwar, district Etah.

The station consists of a tower of sun-dried bricks and mud cement, 28 feet high and 14 feet in diameter at top, having a central hollow core of burnt brick: it has a mark-stone at 1 foot below the ground floor. The bearings and distances of surrounding villages are:—Firozpur 0.5 mile S.S.W.; Chadpur 0.5 mile N.W.; and Bhuloli 0.7 mile N.E.

XXVIII. Sankráo Tower Station, lat.  $28^{\circ} 2'$ , long.  $78^{\circ} 35'$ —observed at in 1841 and 1843—is situated on the site of an old fort on a high spur of the bank which bounds the southern edge of the *khádar* or low lands of the Ganges, and stands close to the west side of the village of Sankráo which is distant within half-a-mile to the south of the old bed of that river: tahsíl Atrauli, pargana Gangíri, district Aligarh.

The station consists of a tower of burnt bricks and mud cement, 37.3 feet high and 14 feet in diameter at top, having a central hollow core of masonry: it has a mark-stone at 1 foot below the ground floor. The bearings and distances of surrounding villages are:—Rustamnala 1.1 miles W. by N.; Mohkampur 1.2 miles S.S.E.; and Síkri 1.1 miles E. by S.

XXIX. Sarsotha Tower Station, lat.  $28^{\circ} 6'$ , long.  $78^{\circ} 48'$ —observed at in 1843—is situated on the northern edge of the *khádar* or low lands of the Ganges, and stands about half-a-mile N.E. of the hamlet of Sarsotha a place of Hindu pilgrimage: thána, tahsíl and pargana Sahaswán, district Budaun.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 23.8 feet high: it has a mark-stone in the foundation, another at 7 feet above ground level, and a third at summit. The bearings and distances of surrounding villages are:—Manikpur 1 mile S.W.; Alipur 0.6 mile N.W.; and Guhlal 2.3 miles N.E. by E.

XXX. Sakrora Tower Station, lat.  $28^{\circ} 13'$ , long.  $78^{\circ} 36'$ —observed at in 1843—is situated on a mound (about 10 feet in height) within half-a-mile S. by W. of the village of Sakrora: thána Asadpur, tahsíl Gunnaur, pargana Asadpur, district Budaun.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 21 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Lahra 0.5 mile W.N.W.; Mirzapur 0.6 mile S.; and Bandrái 1.3 miles N.E. by E.

XXXI. Parauli Tower Station, lat.  $28^{\circ} 10'$ , long.  $78^{\circ} 24'$ —observed at in 1843—is situated on high ground about 350 yards due north of the village of Parauli or Parhau: thána Ramghat, tahsíl Anúpsahr, pargana Dibai, district Bulandshahr.

The station consists of a tower of unburnt bricks and mud cement, 15 feet in diameter at top, enclosing a central solid pillar of masonry 18.8 feet high: it has a mark-stone at ground level, another at 7 feet above it, and a third at summit. The bearings and distances of surrounding villages are:—Rampur 0.7 mile E.; Bajhera 0.6 mile S.E.; Jírajpur Khurd 1.2 miles W.; and Belon Nagla 0.9 mile N.

XXXII. Kariámái Tower Station, lat.  $28^{\circ} 15'$ , long.  $78^{\circ} 48'$ —observed at in 1843—is situated on a slight elevation distant half-a-mile east of the village of Kariámái: thána Islámnagar, tahsíl Bisauli, pargana Islámnagar, district Budaun.

The station consists of a tower of unburnt bricks and mud cement, 15 feet in diameter at top, enclosing a central solid pillar of masonry 17.3 feet high: it has a mark-stone at ground level, and another at summit. The bearings and distances of surrounding villages are:—Bhartpur 0.4 mile S.S.E.; Udaipur 0.8 mile N.E.; and Firozpur 1.1 miles due N.

**XXXIII.** Rajauli Tower Station, lat.  $28^{\circ} 22'$ , long.  $78^{\circ} 28'$ —observed at in 1843—is situated on the *khadar* or low lands of the Ganges, and stands 0.4 mile S.E. of the village of Rajauli or Rajawali: thána Rajpura, tahsíl Gunnaur, pargana Rajpura, district Budaun.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 23 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Paniwara 1.3 miles S.W.; Neora 1.3 miles S. by E.; and Gobindpur 1.1 miles due E.

**XXXIV.** Mehtra Tower Station, lat.  $28^{\circ} 22'$ , long.  $78^{\circ} 41'$ —observed at in 1843—is situated on a mound (about 10 feet in height) distant  $\frac{1}{2}$  mile north of the small village of Mehtra: tahsíl and pargana Sambhal, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 16 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Bahpur Patti 1.1 miles E.; Sultánpur 2.4 miles W.; Mirzapur 0.9 mile N.N.E.; and Yazafpur 0.8 mile N.W. by N.

**XXXV.** Bámsgopál Tower Station, lat.  $28^{\circ} 33'$ , long.  $78^{\circ} 34'$ —observed at in 1843—is situated on a sandy mound (7 or 8 feet in height) distant 500 yards west of the temple of Bámsgopál a place of Hindu pilgrimage: tahsíl and pargana Sambhal, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 18.8 feet high: it has a mark-stone at a little below ground level, and another at summit. The bearings and distances of surrounding places are:—Sambhal town 3 miles N.E.; Turrano Sarai 1.8 miles E. by S.; Gandhipura village 1 mile N. by E.; Busla village 1.7 miles W. by S.; and Bahádurpur Sarai 1.1 miles S.W. by S.

**XXXVI.** Chandanpur Tower Station, lat.  $28^{\circ} 34'$ , long.  $78^{\circ} 21'$ —observed at in 1843—is situated at the distance of half-a-mile to the E.S.E. of the village of Chandanpur: tahsíl and pargana Hasanpur, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 16.5 feet high: it has a mark-stone at ground level, another 7 feet above it, and a third at summit. The bearings and distances of surrounding villages are:—Deorara 0.8 mile S.; Khanraua 1.8 miles W.S.W.; and Ohhapna 2.1 miles N.W. by N.

**XXXVII.** Barauli Tower Station, lat.  $28^{\circ} 32'$ , long.  $78^{\circ} 48'$ —observed at in 1843—is situated on a mound (about 20 feet in height) which is apparently the site of a deserted village, and is distant nearly  $1\frac{1}{2}$  miles N. E. of the village of Barauli: tahsíl and pargana Bilári, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 16.5 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Khásepur 0.6 mile W.; Pípli 0.8 mile N.E.; and Akrauli Auliapur 1.1 miles E.S.E.

**XXXVIII.** Kandarki Tower Station, lat.  $28^{\circ} 44'$ , long.  $78^{\circ} 27'$ —observed at in 1843—is situated close to the eastern side of the village of Kandarki: tahsíl and pargana Hasanpur, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 18.7 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Khairpur 1.1 miles E.S.E.; Begpur 1 mile S.W. by W.; and Jehul 1 mile W.N.W.

**XXXIX.** Aтора Tower Station, lat.  $28^{\circ} 43'$ , long.  $78^{\circ} 40'$ —observed at in 1843—is situated on a mound (about 30 feet in height) immediately N. W. of the village of Aтора or Athaura on the high road from Moradabad to Sambhal and Aligarh: tahsíl and pargana Sambhal, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 17.8 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Athauri 0.4 mile S.; Bháuddínpur 0.8 mile W.; Harthali 1.3 miles N.W.; and Sháhpur 1.6 miles E.N.E.

**XL.** Sirsa Tower Station, lat.  $28^{\circ} 55'$ , long.  $78^{\circ} 35'$ —observed at in 1843—is situated on a mound (about 15 feet in height) distant 600 yards north of the village of Sirsa: tahsíl and pargana Amroha, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 26 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Daryapur 0.7 mile S.W. by W.; Manye Chak 0.4 mile N.E. by N.; Raghunáthpur 1 mile S.E. by S.; and Háshampur 0.9 mile N.W.

**XLI. Lút Tower Station**, lat.  $28^{\circ} 54'$ , long.  $78^{\circ} 21'$ —observed at in 1843—is situated in the lands of the village of Lút: tahsíl and pargana Hasanpur, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 20 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Mahamdi 0·1 mile N.N.W.; Afzalpur 0·6 mile S. by E.; Kurala 0·6 mile N.E.; and Lakhania 1·2 miles S.W.

**XLII. Bhatauli Tower Station**, lat.  $28^{\circ} 54'$ , long.  $78^{\circ} 46'$ —observed at in 1843—is situated at the distance of about 1 mile west of the village of Bhatauli: tahsíl, pargana and district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 14·5 feet high: it has a mark-stone at summit. The bearings and distances of surrounding places are:—Moghalpur town 1·6 miles N.; Mahtakpur 1·2 miles W.S.W.; and Gopálpur 1·9 miles W. by N.

**XLIII. Milik Tower Station**, lat.  $29^{\circ} 5'$ , long.  $78^{\circ} 28'$ —observed at in 1843—is situated in the lands of the village of Lodhipur Milik: tahsíl Chánpur, pargana Burhpur or Nurpur, district Bijnor.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 17·3 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Sahela 1·1 miles E.; Ber 0·6 mile S.S.E.; Shehbonpur 0·6 mile W.S.W.; and Mor Makdúmpur 1·2 miles N.E. by N.

**XLIV. Akbarpur Tower Station**, lat.  $29^{\circ} 5'$ , long.  $78^{\circ} 41'$ —observed at in 1842 and 1843—is situated close to the high road from Hardwár to Moradabad, and distant about half-a-mile N.W. of the village of Akbarpur: tahsíl and pargana Amroha, district Moradabad.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 15 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Garhi 0·4 mile S. by W.; Burhpur 0·8 mile W. by S.; and Salámpur 0·5 mile N.E. by E.

**XLV. Sarkára Tower Station**, lat.  $29^{\circ} 16'$ , long.  $78^{\circ} 35'$ —observed at in 1843—is situated close to the high road from Hardwár to Moradabad, and distant about 0·6 mile S.S.E. of the village of Sarkára: tahsíl Dhámpur, pargana Sherkot, district Bijnor.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 16·3 feet high: it has a mark-stone at summit. The bearings and distances of surrounding villages are:—Rajmul 0·3 mile S.S.E.; Nasirpur Bhunwari 1·3 miles W.S.W.; and Salámpur Sani 0·8 mile S. by W.

**XLVI. Haldaur Tower Station**, lat.  $29^{\circ} 17'$ , long.  $78^{\circ} 19'$ —observed at in 1843—is situated on a sandy mound (8 or 9 feet in height) in the lands of the village of Rasúlpur, and is distant about 1 mile S.W. of the large village of Haldaur: tahsíl Bijnor, pargana Daranagar, district Bijnor.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 19·7 feet high: it has a mark-stone at top. The bearings and distances of surrounding villages are:—Chajjupura 0·8 mile S.E. by E.; Uttapur 0·8 mile S.W.; and Sikandarpur Sani 1·1 miles nearly due N.

**XLVII. Nandi Tower Station**, lat.  $29^{\circ} 17'$ , long.  $78^{\circ} 49'$ —observed at in 1842 and 1843—is situated in the lands of the village of Púranpur, and is distant about half-a-mile E.S.E. of the village of Nandi: tahsíl and pargana Káshipur, district Taráí.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central solid pillar of masonry 12 feet high: it has a mark-stone at summit. The surrounding villages are:—Púranpur 0·6 mile N.; Raipur; Haripura; and Mowa Dabra.

**XLVIII. Harpálsid Hill Station**, lat.  $29^{\circ} 40'$ , long.  $78^{\circ} 36'$ —observed at in 1843—is situated on the peak immediately west of the hill of Harpálsid on the southern border of the Sub-Himalaya mountains, and is approached from Najíabad by Kotkadr and Bagnala: district Garhwál.

The station is denoted by the centre of a circle engraved on a stone which is fixed in the middle of a platform and is flush with the level of the ground. The station of 1843 was re-visited in 1866 in the course of the secondary operations of the Kumaun and Garhwál Survey, but, from the absence of information to the contrary, no alteration in its construction appears to have been made.

**I.—(Of the North-East Longitudinal Series).** Mábegarh Hill Station, lat.  $29^{\circ} 53'$ , long.  $78^{\circ} 30'$ —observed at in 1842, 1843, 1850 and 1865—is situated on the hill of that name, and adjoins a rude temple to the north: pargana Ajmir, district Garhwál.

The station consists of a platform of stones and earth, 14 feet square at top, enclosing a central isolated pillar of masonry 6·9 feet

high: it has a mark-stone at 1 foot above ground level, and another at summit. The original station of 1842-43 which was common to the Budhon Meridional and the North Connecting Series—was re-visited in 1850 in the course of the operations of the North-East Longitudinal Series, and again in 1865 to originate the Kumaun and Garhwál Survey; on neither of these occasions was any alteration made in the construction of the station. The bearings and distances of surrounding villages are:—Kundra 1 mile S. by W.; Jaurási 1·8 miles W.; Harsu 1·6 miles N.; and Badoli 1·8 miles N.N.E.

**XLVIII.**—(*Of the Great Arc Meridional Series, Section 24° to 30°*). Sheopuri Tower Station, lat. 29° 19', long. 78° 2'—observed at in 1836, 1837, 1843 and 1866—is built on an elevated mound, apparently the site of a ruined fort, standing on a high bank which bounds the bed of the Ganges on the west, and distant about half-a-mile east of the village of Sheopuri: tahsíl Jánsath, pargana Bhúma Sambalhera, district Muzaaffarnagar.

The station consists of a hollow masonry tower 40·5 feet high, having a mark-stone in the ground floor. It was originally constructed as a station of the Great Arc Meridional Series, Section 24° to 30°, in the course of the operations of which it was visited in 1836, 1837 and 1866, the Budhon Series having connected with it in 1843: no change was however made on the occasion of the subsequent visits to the original tower. The bearings and distances of surrounding places are:—Mírānpur town 3 miles S.W.; Jaspur village 1 mile N.N.E.; and Alampur 1·2 miles E.

**LII.**—(*Of the Great Arc Meridional Series, Section 24° to 30°*). Mahesari Tower Station, lat. 29° 30', long. 78° 11'—observed at in 1843, 1851, 1865 and 1866—is built on a sand ridge (about 20 feet in height), near the S.W. corner of the village of Mahesari: tahsíl Bijnor, pargana Mandáwar, district Bijnor.

The station consists of a tower of unburnt bricks and mud cement, 14 feet square at top, enclosing a central pillar of masonry 13·5 feet high which is solid to a height of 12 feet above ground level and perforated thereafter: it has a mark-stone at the level of the ground, and others at 7 and 12 feet respectively above this level. The station of 1843—which was 12 feet in height—was re-visited in 1851 in the course of the operations of the North-East Longitudinal Series, when the masonry pillar was found in good order and the upper mark-stone undisturbed. When again visited in 1865-66 in connection with the Great Arc Meridional Series, Section 24° to 30°, the pillar and upper mark-stone were found in good preservation: on this occasion however the height of the pillar was raised to 13½ feet, but no mark-stone was placed at its summit, a hollow cylindrical space, 4 inches in diameter, having been left for reference to the old mark-stone. The bearings and distances of surrounding places are:—Mandáwar 1·6 miles S.S.W.; Shahbazpur 1·2 miles W.; Ratanpur Raiya 0·8 mile N.N.W.; and the town of Kiratpur about 3 miles E.

February 1877.

J. B. N. HENNESSEY,

*In charge of Computing Office.*

## BUDHON MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the preceding descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives additional information as to position, construction, and present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

| No. of Station | Local name | District                     | Pargana, &c.                              | Village in which the Station lies | Remarks on the Construction and Condition of the Station                                                |
|----------------|------------|------------------------------|-------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------|
| III *          | ...        | Saugor                       | Tah. Kurai, Taluka Pitihra, Thá. Baraudia | Budhon                            | ...                                                                                                     |
| VII *          | ...        | „                            | P., Tah. and Thá. Banda                   | Tinsi                             | ...                                                                                                     |
| I              | ...        | Lalitpur                     | Tah. Mahroni, P. Máraura                  | Patna                             | The upper mark-stone wanting as reported in January 1870.                                               |
| II             | ...        | Bundelkhand Political Agency | P. Baldeogarh                             | Dargawa                           | ...                                                                                                     |
| III            | ...        | Lalitpur                     | Tah. Mahroni, P. Bánpur                   | Dhandkua                          | The pillar fallen down as reported in May 1867.                                                         |
| IV             | Andheri    | Psagarh (Gwalior territory)  | P. Marguli                                | Sarsud                            | No trace of the station found as reported in 1877.                                                      |
| V              | ...        | Jhánsi                       | Tah. Jhánsi                               | Gwáli                             | No mark-stone found as reported in May 1867.                                                            |
| VI             | Hanspura   | „                            | Tah. Mau                                  | Hanspura                          | No mark-stone found as reported in May 1867. A pile of earth and stones raised over the pillar in 1879. |
| VII            | ...        | ...                          | ...                                       | ...                               | No report received.                                                                                     |
| VIII           | ...        | Jhánsi (Gwalior territory)   | P. Karera                                 | Algi Dinara                       | ...                                                                                                     |

NOTE.—Stations III \* and VII \* appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral. Thá, for thána.

P. stands for pargana, Tah. for tahsil, and

| No. of Station | Local name   | District                     | Pargana, &c.                      | Village in which the Station lies | Remarks on the Construction and Condition of the Station                                                                                                                                                         |
|----------------|--------------|------------------------------|-----------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IX             | ...          | Bundelkhand Political Agency | Tah. Datia                        | Daryapur                          | ...                                                                                                                                                                                                              |
| X              | ...          | Narwar (Gwalior territory)   | P. Karhia                         | Mahārājpur                        | ...                                                                                                                                                                                                              |
| XI             | ...          | "                            | P. Narwar                         | ...                               | ...                                                                                                                                                                                                              |
| XII            | ...          | I'sagarh (Gwalior territory) | P. Chanderi                       | Karehra                           | ...                                                                                                                                                                                                              |
| XIII           | ...          | Gwalior                      | P. Gird Gwalior                   | Raepur                            | ...                                                                                                                                                                                                              |
| XIV            | ...          | "                            | P. Pichhor                        | Gujara                            | ...                                                                                                                                                                                                              |
| XV             | Saníchari    | "                            | P. Kotwál                         | Ántri                             | The pillar fallen down, only the mark remains, as reported in May 1877.                                                                                                                                          |
| XVI            | ...          | Sikarwári (Gwalior)          | ...                               | ...                               | ...                                                                                                                                                                                                              |
| XVII           | Gormín       | Tonwarghár (Gwalior)         | P. Gormín                         | Gormín                            | The tower fallen down as reported in May 1877.                                                                                                                                                                   |
| XVIII          | ...          | Bhind (Gwalior)              | P. Bhind                          | Bhind                             | ...                                                                                                                                                                                                              |
| XIX            | Hathkanth    | Agra                         | P. Panáhat                        | Hathkanth                         | ...                                                                                                                                                                                                              |
| XX             | ...          | "                            | Ditto.                            | Panáhat                           | ...                                                                                                                                                                                                              |
| XXI            | Sarsaganj    | Mainpuri                     | Tah. Shikohabad, Thá. Sarsaganj   | Madanpur                          | The arch and the lower portion of the central pillar were found dug into up to the perforation.                                                                                                                  |
| XXII           | ...          | Agra                         | P. Firozabad                      | Raepur                            | ...                                                                                                                                                                                                              |
| XXIII          | Jasrána      | Mainpuri                     | Tah. Mustafabad, Thá. Jasrána     | Kushiari                          | About 20 feet of the pillar fallen down as reported in March 1873.                                                                                                                                               |
| XXIV           | ...          | ...                          | ...                               | ...                               | The station was connected with the Revenue Survey line of levels in 1873, under Colonel Anderson, when the lower mark-stone was found intact and the height of summit of pillar above this mark to be 42.5 feet. |
| XXV            | ...          | Etah                         | Tah., P. and Thá. Etah            | Kilárman                          | The pillar 42 feet high as reported in 1874.                                                                                                                                                                     |
| XXVI           | Salímpur     | "                            | Tah. and Thá. Kásganj, P. Bilráam | Salímpur                          | The pillar 35 feet high as reported in 1874.                                                                                                                                                                     |
| XXVII          | ...          | "                            | Tah. Kásganj, P. and Thá. Saháwar | Jamálpur                          | The pillar 25 feet high as reported in 1874.                                                                                                                                                                     |
| XXVIII         | Minár Sankra | Aligarh                      | Tah. Atrauli, P. Gangiri          | Sankra                            | The mark-stone wanting as reported in 1867.                                                                                                                                                                      |

NOTE.—Stations XXI to XLVII were visited in 1865-66 by Mr. W. Ivey, Assistant Surveyor, who was especially deputed for the purpose. With regard to the central paka pillars, their condition when visited and the repairs effected are given in detail above. As respects the kacha towers, around the pillars, these were found either partially or wholly washed away; nor were any measures taken specially for their restoration. Mr. Ivey protected the stations in the following manner:—the summits of the pillars were capped by conical mounds of sun-dried bricks or earthwork to carry off the rainfall, and the pillars themselves were enclosed in same materials up to varying heights. After this he transferred all these stations to the charge of local officials.



| No.<br>of Station | Local name            | District    | Pargana, &c.                               | Village in which<br>the Station<br>lies | Remarks on the<br>Construction and Condition<br>of the Station                                                                                                                                                             |
|-------------------|-----------------------|-------------|--------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| XXIX              | Mánikpur              | Budaun      | Tah., P. and Thá. Sahas-<br>wán            | Mánikpur                                | The central pillar and its upper<br>mark-stone were found uninjured.                                                                                                                                                       |
| XXX               | ...                   | "           | Tah. Gunnaur, P. Asad-<br>pur              | Sakrora                                 | The central pillar and its upper<br>mark engraved on a burnt brick<br>were found uninjured.                                                                                                                                |
| XXXI              | ...                   | Bulandshahr | Tah. Anúpsahr, P. Di-<br>bai, Thá. Rámghat | Parauli                                 | The central pillar and its upper<br>mark-stone were found all right.                                                                                                                                                       |
| XXXII             | ...                   | Budaun      | Tah. Bisauli, P. and Thá.<br>Islámnagar    | Kariámái                                | Ditto.                                                                                                                                                                                                                     |
| XXXIII            | ...                   | "           | Tah. Gunnaur, P. and<br>Thá. Rajpura       | Rajauli                                 | The central pillar was found half<br>thrown down, it was raised by 3 feet<br>with burnt bricks and mud ce-<br>ment, making its height about 14<br>feet above ground.                                                       |
| XXXIV             | Mehtra Dha-<br>rampur | Moradabad   | P. Sambhal                                 | Mehtra                                  | The upper mark-stone was found<br>intact, the central pillar partially<br>dug into at base and summit.                                                                                                                     |
| XXXV              | Benipur Chak          | "           | Ditto.                                     | BánsGOPálpur                            | The central pillar and the upper<br>mark-stone were found all right.                                                                                                                                                       |
| XXXVI             | Chandanpur<br>Khádar  | "           | P. Hasanpur                                | Chandanpur<br>Khádar                    | Ditto.                                                                                                                                                                                                                     |
| XXXVII            | Umra                  | "           | P. Bilári                                  | Barauli                                 | The upper mark-stone was missing,<br>and portion of the summit of the<br>central pillar broken.                                                                                                                            |
| XXXVIII           | Kandarki              | "           | P. Hasanpur                                | Kandarki                                | The central pillar and its upper<br>mark engraved on a burnt brick<br>were found perfect.                                                                                                                                  |
| XXXIX             | ...                   | "           | P. Sambhal                                 | Atora                                   | The upper mark-stone was missing,<br>and portion of the summit of the<br>pillar broken.                                                                                                                                    |
| XL                | ...                   | "           | P. Amroha                                  | Sirsa                                   | The central pillar and the mark-stone<br>on its summit were found perfect.                                                                                                                                                 |
| XLI               | Mahamdí               | "           | P. Hasanpur                                | Lút                                     | The whole structure was found fallen<br>down, with the exception of 4 feet<br>of the central pillar above ground.<br>The pillar was raised 4 feet in<br>height above the old remains, with<br>burnt bricks and mud cement. |
| XLII              | Kázipur               | "           | Tah. Moradabad                             | Bhatauli                                | The central pillar and the mark-stone<br>on its summit were found perfect.                                                                                                                                                 |
| XLIII             | Lodipur Milik         | Bijnor      | Tah. Chándpur, P. Burh-<br>pur             | Lodipur Milik                           | The central pillar and the mark en-<br>graved on a burnt brick, on its<br>summit, were found perfect.                                                                                                                      |

NOTE.—P. stands for pargana, Tah. for tahsil, and Thá. for thána.

| No. of Station | Local name | District      | Pargana, &c.                       | Village in which the Station lies | Remarks on the Construction and Condition of the Station                                                                                                                                                                        |
|----------------|------------|---------------|------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| XLIV           | ...        | Moradabad     | Tah. Amroha                        | Akbarpur                          | The central pillar was found standing and slightly dug into at the base, and the mark-stone missing.                                                                                                                            |
| XLV            | ...        | Bijnor        | Tah. and P. Dhámpur                | Bhíka Ját                         | The central pillar and the mark-stone on its summit were found perfect, the edges of the pillar slightly decayed.                                                                                                               |
| XLVI           | ...        | "             | Tah. Bijnor, P. Dáranagar          | Rasúlpur                          | The central pillar and the mark-stone on its summit were found perfect.                                                                                                                                                         |
| XLVII          | Nanda      | Tarái         | P. Káshipur                        | Púranpur                          | The central pillar was found fallen down to within $1\frac{1}{2}$ feet of the ground level, this was repaired, raised to $2\frac{1}{2}$ feet above ground, with burnt bricks laid in mud cement, and a mark-stone placed on it. |
| XLVIII         | ...        | Garhwál       | P. Talla Salán, Táluka Bhábar      | Bágnála                           | A portion of the masonry given way as reported in 1879.                                                                                                                                                                         |
| I              | ...        | "             | P. Ganga Salán, Patti Ajmír        | Nali Badholi                      | A portion of the masonry given way as reported in 1878.                                                                                                                                                                         |
| XLVIII *       | ...        | Muzaffarnagar | P. and Tah. Jánsath, Thá. Míránpur | Sheopuri                          | ... ..                                                                                                                                                                                                                          |
| LII            | ...        | Bijnor        | Tah. Bijnor, P. Mandáwar           | Mahesari                          | ... ..                                                                                                                                                                                                                          |

NOTE.—Station I appertains to the North-East Longitudinal Series.  
P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

Stations XLVIII\* and LII appertain to the Great Arc Meridional Series, Section 24° to 30°.

September, 1882.

J. B. N. HENNESSEY,  
In charge of Computing Office.

## BUDHON MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. TRIANGLES.

| No. of Triangle | Station       | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|---------------|------------------|-----------------------|-----------|----------|--------|
|                 |               |                  |                       | Log. feet | Feet     | Miles  |
| 1               | Budhon, III   | 1'10             | 65 18 9'77            | 5'1693276 | 147682'0 | 27'970 |
|                 | Tinsmál, VII  | 1'10             | 36 17 41'38           | 4'9832673 | 96220'4  | 18'224 |
|                 | Patna, I      | 1'10             | 78 24 8'85            | 5'2020309 | 159232'2 | 30'158 |
| 2               | Tinsmál, VII  | 1'85             | 61 1 25'95            | 5'2302896 | 169937'6 | 32'185 |
|                 | Patna, I      | 1'86             | 69 29 22'98           | 5'2599285 | 181940'1 | 34'458 |
|                 | Dargawa, II   | 1'85             | 49 29 11'07           | 5'1693276 | 147682'0 | 27'970 |
| 3               | Patna, I      | 1'48             | 40 43 36'35           | 5'0731171 | 118336'0 | 22'412 |
|                 | Dargawa, II   | 1'49             | 69 43 33'56           | 5'2307924 | 170134'5 | 32'222 |
|                 | Dhandkúa, III | 1'49             | 69 32 50'09           | 5'2302896 | 169937'6 | 32'185 |
| 4               | Patna, I      | 2'03             | 56 48 43'89           | 5'2243154 | 167616'0 | 31'745 |
|                 | Dhandkúa, III | 2'04             | 65 2 7'10             | 5'2590521 | 181573'4 | 34'389 |
|                 | Andhiári, IV  | 2'04             | 58 9 9'01             | 5'2307924 | 170134'5 | 32'222 |
| 5               | Dhandkúa, III | 2'08             | 68 20 25'89           | 5'2768654 | 189175'7 | 35'829 |
|                 | Andhiári, IV  | 2'08             | 56 13 31'48           | 5'2283874 | 169194'9 | 32'044 |
|                 | Gwáli, V      | 2'07             | 55 26 2'63            | 5'2243154 | 167616'0 | 31'745 |

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Stations Budhon, III, and Tinsmál, VII, appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

| No. of Triangle | Station       | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|---------------|------------------|-----------------------|-----------|----------|--------|
|                 |               |                  |                       | Log. feet | Feet     | Miles  |
| 6               | Dhandkúa, III | "                | "                     |           |          |        |
|                 | Gwáli, V      | 2'08             | 60 23 39'92           | 5'2443503 | 175529'6 | 33'244 |
|                 | Kathera, VI   | 2'08             | 62 40 7'50            | 5'2536997 | 179349'3 | 33'968 |
| 7               | Gwáli, V      | 2'08             | 56 56 12'58           | 5'2283874 | 169194'9 | 32'044 |
|                 | Kathera, VI   | 1'27             | 38 27 19'24           | 5'0400524 | 109661'1 | 20'769 |
|                 | Bhitári, VII  | 1'27             | 57 0 33'47            | 5'1699658 | 147899'2 | 28'011 |
| 8               | Gwáli, V      | 1'28             | 84 32 7'29            | 5'2443503 | 175529'6 | 33'244 |
|                 | Bhitári, VII  | 1'13             | 54 35 51'47           | 5'0974530 | 125156'4 | 23'704 |
|                 | Algi, VIII    | 1'13             | 50 59 24'08           | 5'0766814 | 119311'3 | 22'597 |
| 9               | Bhitári, VII  | 1'14             | 74 24 44'45           | 5'1699658 | 147899'2 | 28'011 |
|                 | Algi, VIII    | .82              | 65 3 15'56            | 5'0784683 | 119803'2 | 22'690 |
|                 | Daryapur, IX  | .81              | 43 38 36'38           | 4'9599559 | 91191'8  | 17'271 |
| 10              | Algi, VIII    | .82              | 71 18 8'06            | 5'0974530 | 125156'4 | 23'704 |
|                 | Daryapur, IX  | 1'31             | 66 16 16'61           | 5'1781672 | 150718'7 | 28'545 |
|                 | Maharájpur, X | 1'31             | 67 2 10'98            | 5'1806704 | 151589'9 | 28'710 |
| 11              | Daryapur, IX  | 1'31             | 46 41 32'41           | 5'0784683 | 119803'2 | 22'690 |
|                 | Maharájpur, X | 1'21             | 40 58 4'93            | 5'0314303 | 107505'4 | 20'361 |
|                 | Majhár, XIV   | 1'22             | 72 13 31'28           | 5'1935238 | 156143'5 | 29'573 |
| 12              | Maharájpur, X | 1'22             | 66 48 23'79           | 5'1781672 | 150718'7 | 28'545 |
|                 | Majhár, XIV   | .83              | 76 21 32'40           | 5'1103651 | 128933'3 | 24'419 |
|                 | Ráepur, XIII  | .83              | 49 31 1'44            | 5'0039476 | 100913'1 | 19'112 |
| 13              | Algi, VIII    | .83              | 54 7 26'16            | 5'0314303 | 107505'4 | 20'361 |
|                 | Maharájpur, X | 1'50             | 56 45 54'93           | 5'1567811 | 143476'6 | 27'174 |
|                 | Narwar, XI    | 1'50             | 61 8 20'47            | 5'1767521 | 150228'4 | 28'452 |
| 14              | Maharájpur, X | 1'50             | 62 5 44'60            | 5'1806704 | 151589'9 | 28'710 |
|                 | Narwar, XI    | .60              | 43 41 56'21           | 5'0121057 | 102826'7 | 19'475 |
|                 | Karaia, XII   | .59              | 30 52 39'52           | 4'8830021 | 76383'9  | 14'467 |
| 15              | Maharájpur, X | .60              | 105 25 24'27          | 5'1567811 | 143476'6 | 27'174 |
|                 | Karaia, XII   | .53              | 59 53 1'24            | 4'9590868 | 91009'5  | 17'237 |
|                 | Ráepur, XIII  | .53              | 73 33 51'70           | 5'0039476 | 100913'1 | 19'112 |
| 16              | Majhár, XIV   | .52              | 46 33 7'06            | 4'8830021 | 76383'9  | 14'467 |
|                 | Ráepur, XIII  | .80              | 100 21 44'02          | 5'2125181 | 163124'1 | 30'895 |
|                 | Jhánkri, XVI  | .79              | 28 36 16'95           | 4'8997812 | 79392'8  | 15'037 |
| 17              | Ráepur, XIII  | .79              | 51 1 59'03            | 5'1103651 | 128933'3 | 24'419 |
|                 | Jhánkri, XVI  | .86              | 40 42 28'51           | 5'0350055 | 108394'1 | 20'529 |
|                 | Sánichri, XV  | .86              | 38 15 26'99           | 5'0124512 | 102908'5 | 19'490 |
| 18              | Majhár, XIV   | .87              | 101 2 4'50            | 5'2125181 | 163124'1 | 30'895 |
|                 | Ráepur, XIII  | .98              | 46 7 14'06            | 5'0124512 | 102908'5 | 19'490 |
|                 | Sánichri, XV  | .98              | 69 18 46'13           | 5'1256909 | 133564'5 | 25'296 |
| 19              | Jhánkri, XVI  | .98              | 64 33 59'81           | 5'1103651 | 128933'3 | 24'419 |
|                 | Sánichri, XV  | .84              | 70 45 8'27            | 5'0904426 | 123152'3 | 23'324 |
|                 | Gúrmi, XVII   | .84              | 53 2 59'50            | 5'0180567 | 104245'4 | 19'743 |
| 20              | Jhánkri, XVI  | .84              | 56 11 52'23           | 5'0350055 | 108394'1 | 20'529 |
|                 | Gúrmi, XVII   | .74              | 47 50 57'33           | 4'9712527 | 93595'0  | 17'726 |
|                 | Bhind, XVIII  | .75              | 76 29 11'95           | 5'0890180 | 122749'0 | 23'248 |
|                 |               | .75              | 55 39 50'72           | 5'0180567 | 104245'4 | 19'743 |

| No. of Triangle | Station         | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|-----------------|------------------|-----------------------|-----------|----------|--------|
|                 |                 |                  |                       | Log. feet | Feet     | Miles  |
| 21              | Gúrmi, XVII     | .60              | 57 45 4'50            | 4'9633306 | 91903'2  | 17'406 |
|                 | Bhind, XVIII    | .61              | 62 47 5'75            | 4'9851405 | 96636'4  | 18'302 |
|                 | Athgath, XIX    | .60              | 59 27 49'75           | 4'9712527 | 93595'0  | 17'726 |
| 22              | Gúrmi, XVII     | .77              | 65 42 21'93           | 5'0522102 | 112774'3 | 21'359 |
|                 | Athgath, XIX    | .76              | 62 56 23'71           | 5'0421273 | 110186'2 | 20'869 |
|                 | Panáhat, XX     | .76              | 51 21 14'36           | 4'9851405 | 96636'4  | 18'302 |
| 23              | Athgath, XIX    | .62              | 61 29 7'54            | 5'0098981 | 102305'3 | 19'376 |
|                 | Panáhat, XX     | .62              | 42 54 27'16           | 4'8990902 | 79266'6  | 15'013 |
|                 | Sherpur, XXI    | .62              | 75 36 25'30           | 5'0522102 | 112774'3 | 21'359 |
| 24              | Panáhat, XX     | .67              | 58 26 41'42           | 4'9884271 | 97370'4  | 18'442 |
|                 | Sherpur, XXI    | .66              | 58 0 18'27            | 4'9863624 | 96908'6  | 18'354 |
|                 | Firozabad, XXII | .67              | 63 33 0'31            | 5'0098981 | 102305'3 | 19'376 |
| 25              | Sherpur, XXI    | .65              | 71 28 6'01            | 5'0369327 | 108876'2 | 20'620 |
|                 | Firozabad, XXII | .64              | 50 32 31'92           | 4'9477261 | 88659'7  | 16'792 |
|                 | Baragaon, XXIII | .65              | 57 59 22'07           | 4'9884271 | 97370'4  | 18'442 |
| 26              | Firozabad, XXII | .92              | 66 30 21'91           | 5'0930261 | 123887'1 | 23'463 |
|                 | Baragaon, XXIII | .92              | 59 47 19'95           | 5'0672111 | 116737'7 | 22'109 |
|                 | Pondri, XXIV    | .91              | 53 42 18'14           | 5'0369327 | 108876'2 | 20'620 |
| 27              | Baragaon, XXIII | .98              | 62 54 57'89           | 5'0922214 | 123657'8 | 23'420 |
|                 | Pondri, XXIV    | .97              | 53 57 33'49           | 5'0503986 | 112304'9 | 21'270 |
|                 | Kilármáo, XXV   | .98              | 63 7 28'62            | 5'0930261 | 123887'1 | 23'463 |
| 28              | Pondri, XXIV    | .98              | 57 55 48'43           | 5'0697293 | 117416'6 | 22'238 |
|                 | Kilármáo, XXV   | .98              | 58 53 16'24           | 5'0741940 | 118629'9 | 22'468 |
|                 | Salámpur, XXVI  | .99              | 63 10 55'33           | 5'0922214 | 123657'8 | 23'420 |
| 29              | Kilármáo, XXV   | .70              | 54 56 14'63           | 4'9963783 | 99169'6  | 18'782 |
|                 | Salámpur, XXVI  | .69              | 49 20 8'25            | 4'9633247 | 91901'9  | 17'406 |
|                 | Jamálpur, XXVII | .70              | 75 43 37'12           | 5'0697293 | 117416'6 | 22'238 |
| 30              | Salámpur, XXVI  | .75              | 80 27 37'63           | 5'1015468 | 126341'7 | 23'928 |
|                 | Jamálpur, XXVII | .74              | 48 49 5'33            | 4'9841721 | 96421'1  | 18'262 |
|                 | Sankráo, XXVIII | .74              | 50 43 17'04           | 4'9963783 | 99169'6  | 18'782 |
| 31              | Jamálpur, XXVII | .63              | 35 36 24'33           | 4'8687472 | 73917'5  | 14'000 |
|                 | Sankráo, XXVIII | .64              | 60 2 31'15            | 5'0413751 | 109995'5 | 20'832 |
|                 | Sarsotha, XXIX  | .64              | 84 21 4'52            | 5'1015468 | 126341'7 | 23'928 |
| 32              | Sankráo, XXVIII | .36              | 67 27 52'43           | 4'8901521 | 77651'9  | 14'707 |
|                 | Sarsotha, XXIX  | .35              | 50 59 11'94           | 4'8150687 | 65323'4  | 12'372 |
|                 | Sakrora, XXX    | .35              | 61 32 55'63           | 4'8687472 | 73917'5  | 14'000 |
| 33              | Sarsotha, XXIX  | .28              | 57 42 23'24           | 4'8266265 | 67085'2  | 12'706 |
|                 | Sakrora, XXX    | .28              | 44 12 14'06           | 4'7429723 | 55331'5  | 10'479 |
|                 | Kariámái, XXXII | .29              | 78 5 21'80            | 4'8901521 | 77651'9  | 14'707 |
| 34              | Sakrora, XXX    | .25              | 50 32 9'19            | 4'7423343 | 55250'3  | 10'464 |
|                 | Kariámái, XXXII | .25              | 59 50 44'37           | 4'7915573 | 61881'0  | 11'720 |
|                 | Mehtra, XXXIV   | .25              | 69 37 6'44            | 4'8266265 | 67085'2  | 12'706 |
| 35              | Sakrora, XXX    | .32              | 67 2 52'69            | 4'8670317 | 73626'1  | 13'944 |
|                 | Mehtra, XXXIV   | .32              | 62 14 35'62           | 4'8497616 | 70755'7  | 13'401 |
|                 | Rajauli, XXXIII | .32              | 50 42 31'69           | 4'7915573 | 61881'0  | 11'720 |

| No. of Triangle | Station           | Spherical Excess | Corrected Plane Angle | Distance  |         |        |
|-----------------|-------------------|------------------|-----------------------|-----------|---------|--------|
|                 |                   |                  |                       | Log. feet | Feet    | Miles  |
| 36              | Sankráo, XXVIII   | "                | ° ' "                 |           |         |        |
|                 | Sakrora, XXX      | .33              | 58 56 22.82           | 4.8372038 | 68739.1 | 13.019 |
|                 | Parauli, XXXI     | .33              | 66 33 57.62           | 4.8670283 | 73625.5 | 13.944 |
| 37              | Sakrora, XXX      | .32              | 54 29 39.56           | 4.8150687 | 65323.4 | 12.372 |
|                 | Parauli, XXXI     | .37              | 70 5 48.01            | 4.9037644 | 80124.3 | 15.175 |
|                 | Rajauli, XXXIII   | .36              | 56 7 56.35            | 4.8497616 | 70755.7 | 13.401 |
| 38              | Mehtra, XXXIV     | .36              | 53 46 15.64           | 4.8372038 | 68739.1 | 13.019 |
|                 | Rajauli, XXXIII   | .39              | 59 54 3.90            | 4.8805517 | 75954.2 | 14.385 |
|                 | Bámsgopál, XXXV   | .40              | 63 6 6.80             | 4.8937284 | 78294.0 | 14.828 |
| 39              | Rajauli, XXXIII   | .39              | 56 59 49.30           | 4.8670317 | 73626.1 | 13.944 |
|                 | Bámsgopál, XXXV   | .39              | 55 37 36.82           | 4.8578009 | 72077.7 | 13.651 |
|                 | Chandanpur, XXXVI | .39              | 63 56 28.51           | 4.8945904 | 78449.5 | 14.858 |
| 40              | Bámsgopál, XXXV   | .39              | 60 25 54.67           | 4.8805517 | 75954.2 | 14.385 |
|                 | Chandanpur, XXXVI | .34              | 54 44 8.87            | 4.8245758 | 66769.1 | 12.646 |
|                 | Kandarki, XXXVIII | .34              | 63 27 2.37            | 4.8642249 | 73151.8 | 13.855 |
| 41              | Bámsgopál, XXXV   | .34              | 61 48 48.76           | 4.8578009 | 72077.7 | 13.651 |
|                 | Kandarki, XXXVIII | .31              | 59 27 32.60           | 4.8322276 | 67956.0 | 12.870 |
|                 | Atora, XXXIX      | .31              | 52 33 4.04            | 4.7968539 | 62640.3 | 11.864 |
| 42              | Mehtra, XXXIV     | .31              | 67 59 23.36           | 4.8642249 | 73151.8 | 13.855 |
|                 | Bámsgopál, XXXV   | .37              | 58 29 29.60           | 4.8614015 | 72677.8 | 13.765 |
|                 | Barauli, XXXVII   | .36              | 54 48 30.81           | 4.8430198 | 69665.8 | 13.194 |
| 43              | Bámsgopál, XXXV   | .37              | 66 41 59.59           | 4.8937284 | 78294.0 | 14.828 |
|                 | Barauli, XXXVII   | .34              | 70 3 27.78            | 4.8926775 | 78104.8 | 14.793 |
|                 | Atora, XXXIX      | .34              | 48 55 49.75           | 4.7968539 | 62640.3 | 11.864 |
| 44              | Kandarki, XXXVIII | .34              | 61 0 42.47            | 4.8614015 | 72677.8 | 13.765 |
|                 | Atora, XXXIX      | .38              | 63 45 26.37           | 4.8895968 | 77552.7 | 14.688 |
|                 | Sirsa, XL         | .38              | 64 26 6.14            | 4.8920916 | 77999.5 | 14.773 |
| 45              | Atora, XXXIX      | .37              | 51 48 27.49           | 4.8322276 | 67956.0 | 12.870 |
|                 | Sirsa, XL         | .34              | 46 52 26.71           | 4.7868408 | 61212.6 | 11.593 |
|                 | Bhatauli, XLII    | .34              | 65 30 20.69           | 4.8826480 | 76321.7 | 14.455 |
| 46              | Sirsa, XL         | .35              | 67 37 12.60           | 4.8895968 | 77552.7 | 14.688 |
|                 | Bhatauli, XLII    | .31              | 65 23 49.00           | 4.8558889 | 71761.1 | 13.591 |
|                 | Akbarpur, XLIV    | .31              | 63 44 48.48           | 4.8499417 | 70785.1 | 13.406 |
| 47              | Sirsa, XL         | .31              | 50 51 22.52           | 4.7868408 | 61212.6 | 11.593 |
|                 | Akbarpur, XLIV    | .33              | 58 19 37.39           | 4.8376105 | 68803.5 | 13.031 |
|                 | Milik, XLIII      | .34              | 60 33 37.57           | 4.8476064 | 70405.5 | 13.334 |
| 48              | Kandarki, XXXVIII | .34              | 61 6 45.04            | 4.8499417 | 70785.1 | 13.406 |
|                 | Sirsa, XL         | .37              | 58 50 3.37            | 4.8615230 | 72698.1 | 13.769 |
|                 | Lút, XLI          | .36              | 54 31 11.50           | 4.8400080 | 69184.4 | 13.103 |
| 49              | Sirsa, XL         | .37              | 66 38 45.13           | 4.8920916 | 77999.5 | 14.773 |
|                 | Lút, XLI          | .37              | 64 26 31.85           | 4.8826709 | 76325.7 | 14.456 |
|                 | Milik, XLIII      | .36              | 56 19 22.02           | 4.8476064 | 70405.5 | 13.334 |
| 50              | Akbarpur, XLIV    | .37              | 59 14 6.13            | 4.8615230 | 72698.1 | 13.769 |
|                 | Milik, XLIII      | .36              | 65 1 6.34             | 4.8829478 | 76374.4 | 14.465 |
|                 | Sarkára, XLV      | .36              | 60 14 12.40           | 4.8641688 | 73142.3 | 13.853 |
|                 |                   | .36              | 54 44 41.26           | 4.8376105 | 68803.5 | 13.031 |

PRINCIPAL TRIANGULATION. TRIANGLES.

15—J.

| No. of Triangle | Station           | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|-------------------|------------------|-----------------------|-----------|----------|--------|
|                 |                   |                  |                       | Log. feet | Feet     | Miles  |
| 51              | Milik, XLIII      | "                | ° ' "                 |           |          |        |
|                 | Sarkára, XLV      | .47              | 62 57 43.93           | 4.9366917 | 86435.4  | 16.371 |
|                 | Haldaur, XLVI     | .48              | 65 7 44.57            | 4.9446874 | 88041.5  | 16.675 |
| 52              | Sarkára, XLV      | .47              | 51 54 31.50           | 4.8829478 | 76374.4  | 14.465 |
|                 | Haldaur, XLVI     | 1.00             | 88 23 43.66           | 5.2240912 | 167529.5 | 31.729 |
|                 | Harpálsid, XLVIII | 1.00             | 60 33 27.57           | 5.1642053 | 145950.4 | 27.642 |
| 53              | Akbarpur, XLIV    | .99              | 31 2 48.77            | 4.9366917 | 86435.4  | 16.371 |
|                 | Sarkára, XLV      | .41              | 56 29 1.04            | 4.8801843 | 75890.0  | 14.373 |
|                 | Nandi, XLVII      | .42              | 70 2 47.92            | 4.9322743 | 85560.7  | 16.205 |
| 54              | Sarkára, XLV      | .41              | 53 28 11.04           | 4.8641688 | 73142.3  | 13.853 |
|                 | Nandi, XLVII      | .87              | 81 40 59.46           | 5.1888038 | 154455.7 | 29.253 |
|                 | Harpálsid, XLVIII | .86              | 69 13 39.34           | 5.1642053 | 145950.4 | 27.642 |
| 55              | Haldaur, XLVI     | .86              | 29 5 21.20            | 4.8801843 | 75890.0  | 14.373 |
|                 | Harpálsid, XLVIII | 1.02             | 57 57 5.10            | 5.1523302 | 142013.7 | 26.897 |
|                 | Mahehari, LII     | 1.02             | 32 54 28.08           | 4.9591707 | 91027.1  | 17.240 |
| 56              | Haldaur, XLVI     | 1.02             | 89 8 26.82            | 5.2240912 | 167529.5 | 31.729 |
|                 | Mahehari, LII     | .53              | 56 0 34.87            | 4.9274737 | 84620.1  | 16.027 |
|                 | Sheopuri, XLVIII  | .53              | 60 52 34.12           | 4.9501475 | 89155.4  | 16.885 |
| 57              | Harpálsid, XLVIII | .53              | 63 6 51.01            | 4.9591707 | 91027.1  | 17.240 |
|                 | Mahehari, LII     | .94              | 91 57 46.87           | 5.2235428 | 167318.0 | 31.689 |
|                 | Mábegarh, I       | .94              | 30 0 48.08            | 4.9229431 | 83742.0  | 15.860 |
|                 |                   | .94              | 58 1 25.05            | 5.1523302 | 142013.7 | 26.897 |

NOTE.—Stations Sheopuri, XLVIII, and Mahehari, LII appertain to the Great Arc Series—Section 24° to 30°, and Mábegarh, I appertains to the North-East Longitudinal Series.

December 1878.

J. B. N. HENNESSEY,  
In charge of Computing Office.

# BUDHON MERIDIONAL SERIES.

## SECONDARY TRIANGULATION. TRIANGLES.

### PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

| No. of Triangle | Station                               | Corrected Plane Angle<br>° ' "   | Distance                         |                           |                            | Theodolite used | No. of Triangle | Station                                   | Corrected Plane Angle<br>° ' "   | Distance                         |                            |                            | Theodolite used |
|-----------------|---------------------------------------|----------------------------------|----------------------------------|---------------------------|----------------------------|-----------------|-----------------|-------------------------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------|-----------------|
|                 |                                       |                                  | Log. feet                        | Feet                      | Miles                      |                 |                 |                                           |                                  | Log. feet                        | Feet                       | Miles                      |                 |
| 58              | Budhon, III<br>Tinsmál, VII<br>Sagoni | 12 7 27<br>h.s.<br>161 46 37     | 5.029163<br>4.733187<br>5.202031 | 106945<br>54099<br>159232 | 20.254<br>10.246<br>30.158 | Inch<br>12<br>" | 63              | Patna, I<br>Samaspur<br>Pandúa            | 23 40 14<br>18 13 29<br>138 6 17 | 4.522907<br>4.414436<br>4.743873 | 33335<br>25968<br>55446    | 6.314<br>4.918<br>10.501   | Inch<br>12<br>" |
| 59              | Budhon, III<br>Patna, I<br>Sagoni     | 53 10 44<br>h.s.<br>92 39 8      | 4.887100<br>4.733187<br>4.983267 | 77108<br>54099<br>96220   | 14.604<br>10.246<br>18.224 | "<br>"<br>"     | 64              | Tinsmál, VII<br>Patna, I<br>Dhoban        | 59 23 15<br>19 56 9<br>100 40 36 | 5.111729<br>4.709625<br>5.169328 | 129339<br>51242<br>147682  | 24.496<br>9.705<br>27.970  | "<br>15<br>12   |
| 60              | Budhon, III<br>Patna, I<br>Samaspur   | 32 17 31<br>35 41 41<br>112 0 48 | 4.743873<br>4.782158<br>4.983267 | 55446<br>60556<br>96220   | 10.501<br>11.469<br>18.224 | "<br>"<br>"     | 65              | Patna, I<br>Dargawa, II<br>Dhoban         | 49 33 16<br>81 36 2              | 5.116371<br>5.111729<br>5.230290 | 130729<br>129339<br>169938 | 24.759<br>24.496<br>32.185 | 15<br>12<br>12  |
| 61              | Budhon, III<br>Sagoni<br>Samaspur     | 20 53 13<br>96 32 52<br>62 33 55 | 4.337091<br>4.782158<br>4.733187 | 21732<br>60556<br>54099   | 4.116<br>11.469<br>10.246  | "<br>"<br>"     | 66              | Tinsmál, VII<br>Dargawa, II<br>Lakhanjhir | 48 57 28<br>111 52 7             | 5.169863<br>4.808807<br>5.259929 | 147864<br>64388<br>181940  | 28.005<br>12.195<br>34.458 | "<br>"<br>"     |
| 62              | Budhon, III<br>Patna, I<br>Pandúa     | 15 4 8<br>59 21 55<br>105 33 57  | 4.414436<br>4.934213<br>4.983267 | 25968<br>85943<br>96220   | 4.918<br>16.277<br>18.224  | "<br>15<br>12   | 67              | Patna, I<br>Dargawa, II<br>Lakhanjhir     | 60 27 43<br>89 13 29             | 5.169863<br>4.933387<br>5.230290 | 147864<br>85780<br>169938  | 28.005<br>16.246<br>32.185 | 15<br>12<br>12  |

NOTES.—1. Names followed by Roman numerals are those of Principal Stations. Stations Budhon, III, and Tinsmál, VII appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.  
2. The values of the side are given in the same line with the opposite angle.



## SECONDARY TRIANGULATION. TRIANGLES.

17

| No. of Triangle | Station                                          | Corrected Plane Angle | Distance                            |                          |                            | No. of Triangle | Station                                              | Corrected Plane Angle             | Distance                         |                           |                            | No. of Triangle | Station                                              | Corrected Plane Angle             | Distance                         |                           |                            | Theodolite used   |
|-----------------|--------------------------------------------------|-----------------------|-------------------------------------|--------------------------|----------------------------|-----------------|------------------------------------------------------|-----------------------------------|----------------------------------|---------------------------|----------------------------|-----------------|------------------------------------------------------|-----------------------------------|----------------------------------|---------------------------|----------------------------|-------------------|
|                 |                                                  |                       | Log. feet                           | Feet                     | Miles                      |                 |                                                      |                                   | Log. feet                        | Feet                      | Miles                      |                 |                                                      |                                   | Log. feet                        | Feet                      | Miles                      |                   |
| 68              | Tinsmál, VII<br>Lakhanjúr<br>Káli                | h.s.<br>" "           | 4° 58' 50"<br>99 12 27<br>50 48 43  | 41512<br>82003<br>64388  | 7.862<br>15.531<br>12.195  | 81              | Patna, I<br>Pandúa<br>Barodia                        | 57 33 10<br>90 54 35<br>31 32 15  | 4.622171<br>4.695833<br>4.414436 | 41896<br>49610<br>25968   | 7.935<br>9.402<br>4.918    | 12<br>" "       | Patna, I<br>Pandúa<br>Barodia                        | 57 33 10<br>90 54 35<br>31 32 15  | 4.622171<br>4.695833<br>4.414436 | 41896<br>49610<br>25968   | 7.935<br>9.402<br>4.918    | Inch<br>12<br>" " |
| 69              | Patna, I<br>Lakhanjúr<br>Káli                    | h.s.<br>" "           | 4° 59' 41"<br>91 22 1<br>59 41 57   | 41512<br>74083<br>85780  | 7.862<br>14.031<br>16.246  | 82              | Patna, I<br>Lakhanjúr<br>Mahroa                      | 37 41 34<br>47 55 13<br>94 23 13  | 4.721006<br>4.805190<br>4.933387 | 52603<br>63854<br>85780   | 9.963<br>12.094<br>16.246  | 15<br>12<br>" " | Patna, I<br>Lakhanjúr<br>Mahroa                      | 37 41 34<br>47 55 13<br>94 23 13  | 4.721006<br>4.805190<br>4.933387 | 52603<br>63854<br>85780   | 9.963<br>12.094<br>16.246  | 15<br>12<br>" "   |
| 70              | Tinsmál, VII<br>Lakhanjúr<br>Jálampur            | h.s.<br>" "           | 4° 45' 10"<br>22 13 58<br>112 35 20 | 49466<br>26387<br>64388  | 9.368<br>4.998<br>12.195   | 83              | Patna, I<br>Pandúa<br>Mahroa                         | 65 45 31<br>23 59 45              | 4.765104<br>4.805190<br>4.414436 | 58224<br>63854<br>25968   | 11.027<br>12.094<br>4.918  | 15<br>12<br>12  | Patna, I<br>Pandúa<br>Mahroa                         | 65 45 31<br>23 59 45              | 4.765104<br>4.805190<br>4.414436 | 58224<br>63854<br>25968   | 11.027<br>12.094<br>4.918  | 15<br>12<br>12    |
| 71              | Lakhanjúr<br>Dhoban<br>Jálampur                  | h.s.<br>" "           | 74 1 32<br>54 10 36<br>51 47 52     | 58651<br>49466<br>47941  | 11.108<br>9.368<br>9.080   | 84              | Patna, I<br>Barodia<br>Ahmoi                         | 84 14 1<br>16 48 15<br>78 57 44   | 4.701739<br>4.164992<br>4.695833 | 50320<br>14621<br>49640   | 9.530<br>2.769<br>9.402    | " "             | Patna, I<br>Barodia<br>Ahmoi                         | 84 14 1<br>16 48 15<br>78 57 44   | 4.701739<br>4.164992<br>4.695833 | 50320<br>14621<br>49640   | 9.530<br>2.769<br>9.402    | " "               |
| 72              | Tinsmál, VII<br>Jálampur<br>Jagthar Hill Staff   | h.s.<br>" "           | 37 51 41<br>65 42 10<br>31 40 44    | 16660<br>24740<br>26387  | 3.155<br>4.686<br>4.998    | 85              | Patna, I<br>Pandúa<br>Dongra Hill Temple             | 136 55 59<br>15 19 43             | 4.580904<br>4.168764<br>4.414436 | 38008<br>14749<br>25968   | 7.216<br>2.793<br>4.918    | 15<br>12<br>12  | Patna, I<br>Pandúa<br>Dongra Hill Temple             | 136 55 59<br>15 19 43             | 4.580904<br>4.168764<br>4.414436 | 38008<br>14749<br>25968   | 7.216<br>2.793<br>4.918    | 15<br>12<br>12    |
| 73              | Jálampur<br>Jagthar Hill Staff<br>Benaika Temple | h.s.<br>" "           | 106 32 35<br>21 5 54<br>31 40 44    | 39410<br>21135<br>16660  | 5.759<br>4.003<br>3.155    | 86              | Patna, I<br>Mahroa<br>Dongra Hill Temple             | 71 10 28<br>13 17 29              | 4.783342<br>4.168764<br>4.805190 | 60721<br>14749<br>63854   | 11.500<br>2.793<br>12.094  | 15<br>12<br>12  | Patna, I<br>Mahroa<br>Dongra Hill Temple             | 71 10 28<br>13 17 29              | 4.783342<br>4.168764<br>4.805190 | 60721<br>14749<br>63854   | 11.500<br>2.793<br>12.094  | 15<br>12<br>12    |
| 74              | Tinsmál, VII<br>Jálampur<br>Morári Hill Tree     | h.s.<br>" "           | 24 32 19<br>21 5 54<br>31 40 44     | 15328<br>13286<br>26387  | 2.903<br>2.516<br>4.998    | 87              | Samaspur<br>Pandúa<br>Rámpura Hill Staff             | 61 58 0<br>59 1 4                 | 4.535571<br>4.522917<br>4.522907 | 34322<br>33336<br>33335   | 6.500<br>6.314<br>6.314    | " "             | Samaspur<br>Pandúa<br>Rámpura Hill Staff             | 61 58 0<br>59 1 4                 | 4.535571<br>4.522917<br>4.522907 | 34322<br>33336<br>33335   | 6.500<br>6.314<br>6.314    | " "               |
| 75              | Jálampur<br>Benaika Temple<br>Morári Hill Tree   | h.s.<br>" "           | 151 8 51<br>12 4 49<br>8 0 52       | 35344<br>15328<br>21135  | 6.694<br>2.903<br>4.003    | 88              | Pandúa<br>Barodia<br>Mandri                          | 30 48 18<br>72 27 14<br>76 44 28  | 4.343275<br>4.613214<br>4.622171 | 22043<br>41041<br>41896   | 4.175<br>7.773<br>7.935    | " "             | Pandúa<br>Barodia<br>Mandri                          | 30 48 18<br>72 27 14<br>76 44 28  | 4.343275<br>4.613214<br>4.622171 | 22043<br>41041<br>41896   | 4.175<br>7.773<br>7.935    | " "               |
| 76              | Tinsmál, VII<br>Jálampur<br>Singan               | h.s.<br>" "           | 20 46 42<br>151 12 26<br>8 0 52     | 67140<br>91155<br>26387  | 12.716<br>17.264<br>4.998  | 89              | Barodia<br>Ahmoi<br>Mandri                           | 24 6 44<br>16 36 14<br>139 17 2   | 4.498502<br>4.343275<br>4.701739 | 31514<br>22043<br>50320   | 5.969<br>4.175<br>9.530    | " "             | Barodia<br>Ahmoi<br>Mandri                           | 24 6 44<br>16 36 14<br>139 17 2   | 4.498502<br>4.343275<br>4.701739 | 31514<br>22043<br>50320   | 5.969<br>4.175<br>9.530    | " "               |
| 77              | Lakhanjúr<br>Jálampur<br>Singan                  | h.s.<br>" "           | 49 38 32<br>96 12 14<br>34 9 14     | 67140<br>87592<br>49466  | 12.716<br>16.589<br>9.368  | 90              | Pandúa<br>Mandri<br>Gorar                            | 16 25 46<br>22 57 26<br>140 36 48 | 4.262280<br>4.401861<br>4.613214 | 18293<br>25227<br>41041   | 3.465<br>4.778<br>7.773    | " "             | Pandúa<br>Mandri<br>Gorar                            | 16 25 46<br>22 57 26<br>140 36 48 | 4.262280<br>4.401861<br>4.613214 | 18293<br>25227<br>41041   | 3.465<br>4.778<br>7.773    | " "               |
| 78              | Tinsmál, VII<br>Lakhanjúr<br>Bhero               | h.s.<br>" "           | 52 34 24<br>89 0 50<br>38 24 37     | 82301<br>103621<br>64388 | 15.587<br>19.625<br>12.195 | 91              | Ahmoi<br>Mandri<br>Maltaun                           | 13 32 1<br>15 20 41<br>151 7 18   | 4.183844<br>4.237231<br>4.498502 | 15270<br>17268<br>31514   | 2.892<br>3.270<br>5.969    | " "             | Ahmoi<br>Mandri<br>Maltaun                           | 13 32 1<br>15 20 41<br>151 7 18   | 4.183844<br>4.237231<br>4.498502 | 15270<br>17268<br>31514   | 2.892<br>3.270<br>5.969    | " "               |
| 79              | Tinsmál, VII<br>Singan<br>Bhero                  | h.s.<br>" "           | 13 23 0<br>111 55 19<br>54 41 41    | 25854<br>103621<br>91155 | 4.897<br>19.625<br>17.264  | 92              | Mandri<br>Gorar<br>Maltaun                           | 54 55 49<br>52 42 20<br>72 21 51  | 4.196180<br>4.183844<br>4.262280 | 15710<br>15270<br>18293   | 2.975<br>2.892<br>3.465    | " "             | Mandri<br>Gorar<br>Maltaun                           | 54 55 49<br>52 42 20<br>72 21 51  | 4.196180<br>4.183844<br>4.262280 | 15710<br>15270<br>18293   | 2.975<br>2.892<br>3.465    | " "               |
| 80              | Patna, I<br>Samaspur<br>Barodia                  | h.s.<br>" "           | 33 52 56<br>62 46 40<br>83 20 24    | 31121<br>49640<br>55446  | 5.894<br>9.402<br>10.501   | 93              | Patna, I<br>Dhandkúa, III<br>Bara Dongra Hill Temple | 57 43 39<br>20 0 56               | 5.167930<br>4.775182<br>5.230792 | 147207<br>59591<br>170135 | 27.880<br>11.286<br>32.222 | 15<br>" "       | Patna, I<br>Dhandkúa, III<br>Bara Dongra Hill Temple | 57 43 39<br>20 0 56               | 5.167930<br>4.775182<br>5.230792 | 147207<br>59591<br>170135 | 27.880<br>11.286<br>32.222 | 15<br>" "         |

NOTE.—Station Tinsmál, VII appertains to the Calcutta Longitudinal Series of the South-East Quadrilateral. † Instrument not known. \* Base deduced by two sides and included angle.

| No. of Triangle | Station                                                  | Corrected Plane Angle             | Distance                                     |                            |                            | Theodolite used | No. of Triangle | Station                                             | Corrected Plane Angle                   | Distance                                     |                           |                            | Theodolite used |
|-----------------|----------------------------------------------------------|-----------------------------------|----------------------------------------------|----------------------------|----------------------------|-----------------|-----------------|-----------------------------------------------------|-----------------------------------------|----------------------------------------------|---------------------------|----------------------------|-----------------|
|                 |                                                          |                                   | Log. feet                                    | Feet                       | Miles                      |                 |                 |                                                     |                                         | Log. feet                                    | Feet                      | Miles                      |                 |
| 94              | Dhandkúa, III<br>Andhiári, IV<br>Bara Dongra Hill Temple | 45 1 13<br>58 35 58               | 5° 08' 34.2<br>5° 16' 73.0<br>5° 22' 43.15   | 121995<br>147207<br>167616 | 23.105<br>27.880<br>31.745 | Inch<br>15<br>" | 107             | Dhandkúa, III<br>Mora<br>Barh                       | 71 22 49<br>26 44 52<br>81 52 19        | 5° 05' 72.82<br>4° 73' 39.04<br>5° 07' 02.46 | 114099<br>54188<br>119192 | 21.610<br>10.263<br>22.574 | Inch<br>15<br>" |
| 95              | Dargawa, II<br>Dhandkúa, III<br>Sarkaura                 | 56 44 38<br>21 4 7<br>102 11 15   | 5° 00' 53.42<br>4° 63' 86.99<br>5° 07' 31.17 | 101238<br>43521<br>118336  | 19.174<br>8.243<br>22.412  | "<br>"<br>9     | 108             | Dhandkúa, III<br>Manau<br>Bijli                     | 86 18 17<br>12 19 26<br>81 22 17        | 4° 72' 63.54<br>4° 05' 67.29<br>4° 72' 25.15 | 53279<br>11395<br>52785   | 10.091<br>2.158<br>9.997   | "<br>9<br>15    |
| 96              | Dargawa, II<br>Dhandkúa, III<br>Manau                    | 10 6 26<br>13 3 37<br>156 49 57   | 4° 72' 25.15<br>4° 83' 23.22<br>5° 07' 31.17 | 52785<br>67971<br>118336   | 9.997<br>12.873<br>22.412  | 15<br>9         | 109             | Dhandkúa, III<br>Barh<br>Bijli                      | 79 16 2<br>12 8 9<br>88 35 49           | 4° 72' 63.70<br>4° 05' 67.29<br>4° 73' 39.04 | 53256<br>11395<br>54188   | 10.086<br>2.158<br>10.263  | "<br>"<br>"     |
| 97              | Dargawa, II<br>Sarkaura<br>Tehri Palace                  | 60 11 6<br>85 13 5                | 4° 82' 28.41<br>4° 88' 20.89<br>4° 63' 86.99 | 66503<br>76382<br>43521    | 12.595<br>14.466<br>8.243  | 15<br>"         | 110             | Dhandkúa, III<br>Barh<br>Bila Hill Staff            | 69 36 14<br>34 53 44                    | 4° 71' 08.43<br>4° 50' 54.20<br>4° 73' 39.04 | 52462<br>32020<br>54188   | 9.936<br>6.064<br>10.263   | "<br>"<br>"     |
| 98              | Dhandkúa, III<br>Sarkaura<br>Tehri Palace                | 27 17 5<br>16 58 10               | 4° 82' 28.41<br>4° 62' 67.61<br>5° 00' 53.42 | 66503<br>42341<br>101238   | 12.595<br>8.019<br>19.174  | " 9             | 111             | Dhandkúa, III<br>Pabba<br>Ratangawán                | 54 52 30<br>h.s.<br>84 54 17            | 5° 05' 44.72<br>4° 95' 18.22<br>5° 14' 00.53 | 113363<br>89500<br>138055 | 21.470<br>16.951<br>26.147 | "<br>"<br>"     |
| 99              | Dhandkúa, III<br>Andhiári, IV<br>Ero                     | 20 47 17<br>64 46 4<br>94 26 39   | 4° 77' 57.44<br>5° 18' 20.74<br>5° 22' 43.15 | 59668<br>152081<br>167616  | 11.301<br>28.803<br>31.745 | 15<br>"<br>"    | 112             | Dhandkúa, III<br>Barh<br>Ratangawán                 | 74 36 14<br>70 34 35<br>34 49 11        | 4° 96' 13.99<br>4° 95' 18.22<br>4° 73' 39.04 | 91495<br>89500<br>54188   | 17.329<br>16.951<br>10.263 | "<br>"<br>"     |
| 100             | Dhandkúa, III<br>Andhiári, IV<br>Pabba                   | 66 30 47<br>48 21 17<br>65 7 56   | 5° 22' 43.15<br>5° 14' 00.53<br>5° 22' 43.15 | 169440<br>138055<br>167616 | 32.091<br>26.147<br>31.745 | "<br>"<br>"     | 113             | Dhandkúa, III<br>Pabba<br>Mohangarh Fort            | 26 45 46<br>25 11 14<br>h.s.            | 4° 89' 73.17<br>4° 87' 27.96<br>5° 14' 00.53 | 78944<br>74610<br>138055  | 14.951<br>14.131<br>26.147 | "<br>"<br>"     |
| 101             | Andhiári, IV<br>Gwáli, V<br>Pabba                        | 7 52 17<br>47 24 26<br>124 43 17  | 4° 49' 85.92<br>5° 22' 43.15<br>5° 27' 68.65 | 31520<br>169440<br>189176  | 5.970<br>32.091<br>35.829  | "<br>"<br>"     | 114             | Dhandkúa, III<br>Barh<br>Mohangarh Fort             | 46 29 30<br>87 0 52<br>h.s.             | 4° 73' 38.89<br>4° 87' 27.96<br>4° 73' 39.04 | 54186<br>74610<br>54188   | 10.263<br>14.131<br>10.263 | "<br>"<br>"     |
| 102             | Dhandkúa, III<br>Gwáli, V<br>Banarsa                     | 27 17 18<br>19 18 21<br>133 24 21 | 5° 02' 84.59<br>4° 88' 64.05<br>5° 22' 83.87 | 106772<br>76996<br>169195  | 20.222<br>14.582<br>32.044 | "<br>"<br>"     | 115             | Dhandkúa, III<br>Ratangawán<br>Majhgawán Hill Staff | 40 30 37<br>15 49 45<br>h.s.            | 4° 8441.59<br>4° 4073.21<br>4° 9518.22       | 69849<br>29331<br>89500   | 13.229<br>5.555<br>16.951  | "<br>"<br>"     |
| 103             | Dhandkúa, III<br>Pabba<br>Banarsa                        | 29 6 59<br>27 53 23<br>122 59 38  | 4° 90' 35.91<br>4° 88' 64.05<br>5° 14' 00.53 | 80092<br>76996<br>138055   | 15.169<br>14.582<br>26.147 | "<br>"<br>"     | 116             | Andhiári, IV<br>Bara Dongra Hill Temple<br>Birári   | 55 42 20<br>4° 95' 92.9<br>5° 08' 63.42 | 5° 01' 51.05<br>4° 96' 59.29<br>5° 08' 63.42 | 103539<br>92455<br>121995 | 19.610<br>17.510<br>23.105 | "<br>"<br>"     |
| 104             | Dhandkúa, III<br>Gwáli, V<br>Mora                        | 49 49 24<br>44 36 57<br>85 33 39  | 5° 11' 28.19<br>5° 07' 02.46<br>5° 22' 83.87 | 129664<br>119192<br>169195 | 24.558<br>22.574<br>32.044 | "<br>"<br>"     | 117             | Andhiári, IV<br>Ero<br>Birári                       | 61 52 26<br>78 50 28<br>39 17 6         | 4° 91' 06.43<br>4° 96' 59.29<br>4° 77' 57.44 | 83108<br>92455<br>59668   | 15.740<br>17.510<br>11.301 | "<br>"<br>"     |
| 105             | Gwáli, V<br>Bhitári, VII<br>Mora                         | 56 30 33<br>54 46 33<br>68 42 54  | 5° 12' 18.02<br>5° 11' 28.19<br>5° 16' 99.66 | 132374<br>129664<br>147899 | 25.071<br>24.558<br>28.011 | "<br>"<br>"     | 118             | Andhiári, IV<br>Birári<br>Kálapahár                 | 44 48 39<br>15 30 58<br>119 40 23       | 4° 87' 50.23<br>4° 45' 43.16<br>4° 96' 59.29 | 74993<br>28465<br>92455   | 14.203<br>5.391<br>17.510  | "<br>"<br>"     |
| 106             | Dhandkúa, III<br>Andhiári, IV<br>Barh                    | 46 47 3<br>16 50 7<br>116 22 50   | 5° 13' 46.70<br>4° 73' 39.04<br>5° 22' 43.15 | 136355<br>54188<br>167616  | 25.825<br>10.263<br>31.745 | "<br>"<br>"     | 119             | Ero<br>Birári<br>Kálapahár                          | 56 56 41<br>54 48 4<br>68 15 15         | 4° 87' 50.23<br>4° 864.009<br>4° 91' 06.43   | 74993<br>73115<br>83108   | 14.203<br>13.848<br>15.740 | 15<br>"<br>"    |

† Instrument not known.

| No. of Triangle | Station                                  | Corrected Plane Angle                     | Distance                                     |                            |                            | No. of Triangle | Station                                               | Corrected Plane Angle            | Distance                                     |                           |                            | Theodolite used |
|-----------------|------------------------------------------|-------------------------------------------|----------------------------------------------|----------------------------|----------------------------|-----------------|-------------------------------------------------------|----------------------------------|----------------------------------------------|---------------------------|----------------------------|-----------------|
|                 |                                          |                                           | Log. feet                                    | Feet                       | Miles                      |                 |                                                       |                                  | Log. feet                                    | Feet                      | Miles                      |                 |
| 120             | Andhiári, IV<br>Gwáli, V<br>Amarpur      | h.s.<br>33 37 6<br>132 34 38              | 4° 78' 45.8<br>5° 153' 01.3<br>5° 27' 08.65  | 61300<br>142237<br>189176  | 11.610<br>26.939<br>35.829 | 133             | Gwáli, V<br>Bhitári, VII<br>Sanyer Hill Staff         | 8 19 40<br>9 35 24               | 4° 842' 7.83<br>4° 903' 57.2<br>5° 1699' 66  | 60628<br>80089<br>147899  | 13.187<br>15.168<br>28.011 | Inch<br>15<br>" |
| 121             | Gwáli, V<br>Pabba<br>Amarpur             | h.s.<br>81 1 32<br>70 4 1<br>28 54 27     | 4° 808' 93.8<br>4° 787' 45.8<br>4° 498' 59.2 | 64408<br>61300<br>31520    | 12.108<br>11.610<br>5.970  | 134             | Gwáli, V<br>Pabba<br>Sanyer Hill Staff                | h.s.<br>117 28 49<br>46 3 27     | 4° 994' 22.4<br>4° 903' 57.2<br>4° 498' 59.2 | 98679<br>80089<br>31520   | 18.689<br>15.168<br>5.970  | "<br>"<br>"     |
| 122             | Andhiári, IV<br>Pabba<br>Gurar           | h.s.<br>50 44 26<br>87 41 58              | 5° 118' 26.8<br>5° 051' 14.3<br>5° 229' 01.5 | 131301<br>112498<br>169440 | 24.868<br>21.306<br>32.091 | 135             | Gwáli, V<br>Bhitári, VII<br>Jhansi Fort               | 18 3 22<br>42 11 10              | 4° 722' 67.0<br>5° 058' 45.3<br>5° 1699' 66  | 52804<br>114407<br>147899 | 10.001<br>21.668<br>28.011 | "<br>"<br>"     |
| 123             | Andhiári, IV<br>Amarpur<br>Gurar         | h.s.<br>51 13 19<br>99 42 48              | 4° 845' 73.9<br>5° 051' 14.3<br>5° 153' 01.3 | 70103<br>112498<br>142237  | 13.277<br>21.306<br>26.939 | 136             | Gwáli, V<br>Algi, VIII<br>Jhansi Fort                 | 36 32 31<br>68 5 33              | 4° 865' 82.2<br>5° 058' 45.3<br>5° 07668.1   | 73421<br>114407<br>119311 | 13.906<br>21.668<br>22.597 | "<br>"<br>"     |
| 124             | Andhiári, IV<br>Gurar<br>Jhakaura        | h.s.<br>44 4 43<br>53 10 32<br>82 44 45   | 4° 897' 02.1<br>4° 957' 98.2<br>5° 051' 14.3 | 78890<br>90778<br>112498   | 14.941<br>17.193<br>21.306 | 137             | Gwáli, V<br>Bhitári, VII<br>Lahar Hill Staff          | 22 55 51<br>45 54 23             | 4° 790' 93.1<br>5° 056' 53.7<br>5° 1699' 66  | 61792<br>113904<br>147899 | 11.703<br>21.573<br>28.011 | "<br>"<br>"     |
| 125             | Pabba<br>Gurar<br>Jhakaura               | h.s.<br>34 31 26<br>111 29 0              | 4° 897' 02.1<br>4° 902' 93.2<br>5° 118' 26.8 | 78890<br>79971<br>131301   | 14.941<br>15.146<br>24.868 | 138             | Gwáli, V<br>Algi, VIII<br>Lahar Hill Staff            | 31 40 2<br>69 29 32              | 4° 805' 11.8<br>5° 056' 53.7<br>5° 07668.1   | 63844<br>113904<br>119311 | 12.092<br>21.573<br>22.597 | "<br>"<br>"     |
| 126             | Gwáli, V<br>Mora<br>Jár Hill Staff       | h.s.<br>22 47 31<br>55 13 31              | 4° 710' 53.1<br>5° 030' 94.2<br>5° 118' 26.8 | 51349<br>108879<br>139664  | 9.725<br>20.621<br>24.558  | 139             | Gwáli, V<br>Algi, VIII<br>Ghatoli Hill Staff          | 52 14 47<br>30 32 21             | 4° 978' 11.8<br>4° 786' 10.6<br>5° 07668.1   | 95086<br>61109<br>119311  | 18.009<br>11.574<br>22.597 | "<br>"<br>"     |
| 127             | Kathera, VI<br>Mora<br>Jár Hill Staff    | h.s.<br>45 12 19<br>69 9 28               | 4° 710' 53.1<br>4° 830' 10.4<br>4° 818' 99.0 | 51349<br>67625<br>65916    | 9.725<br>12.808<br>12.484  | 140             | Kathera, VI<br>Bhitári, VII<br>Barwa Sagar High Tower | 13 55 56<br>39 46 7              | 4° 515' 36.1<br>4° 939' 72.0<br>5° 0400' 52  | 32761<br>87040<br>109661  | 6.205<br>16.485<br>20.769  | "<br>"<br>"     |
| 128             | Gwáli, V<br>Pabba<br>Talaphári           | h.s.<br>58 36 44<br>99 12 11<br>22 11 5   | 4° 852' 85.3<br>4° 915' 94.0<br>4° 498' 59.2 | 71261<br>82402<br>31520    | 13.496<br>15.607<br>5.970  | 141             | Kathera, VI<br>Bhitári, VII<br>Korar Hill Fort        | 29 17 34<br>54 16 1              | 4° 732' 35.3<br>4° 952' 22.2<br>5° 0400' 52  | 53995<br>89582<br>109661  | 10.226<br>16.966<br>20.769 | "<br>"<br>"     |
| 129             | Gwáli, V<br>Amarpur<br>Talaphári         | h.s.<br>22 24 48<br>115 20 21<br>42 14 51 | 4° 541' 12.3<br>4° 915' 94.0<br>4° 787' 45.8 | 34763<br>82402<br>61300    | 6.584<br>15.607<br>11.610  | 142             | Bhitári, VII<br>Daryapur, IX<br>Korar Hill Fort       | 105 9 9<br>26 19 54              | 5° 0700' 26<br>4° 732' 35.3<br>4° 9599' 56   | 117497<br>53995<br>91192  | 22.253<br>10.226<br>17.271 | "<br>"<br>"     |
| 130             | Amarpur<br>Talaphári<br>Ranha Hill Staff | h.s.<br>57 8 19<br>71 38 12               | 4° 573' 51.8<br>4° 626' 54.8<br>4° 541' 12.3 | 37456<br>42320<br>34763    | 7.094<br>8.015<br>6.584    | 143             | Bhitári, VII<br>Sonania<br>Orchha Temple              | 25 21 40<br>86 28 31             | 4° 3596' 26<br>4° 727' 03.3<br>4° 6955' 20   | 22889<br>53338<br>49604   | 4.335<br>10.102<br>9.395   | "<br>"<br>"     |
| 131             | Gwáli, V<br>Kathera, VI<br>Sonania       | h.s.<br>30 44 54<br>124 59 32             | 4° 944' 64.8<br>5° 039' 59.3<br>5° 244' 35.0 | 88034<br>159545<br>175530  | 16.673<br>20.747<br>33.244 | 144             | Bhitári, VII<br>Algi, VIII<br>Chandeva                | 46 0 35<br>55 25 19<br>78 34 6   | 4° 963' 16.1<br>5° 021' 74.2<br>5° 0974' 53  | 91867<br>105134<br>125156 | 17.399<br>19.912<br>23.704 | "<br>"<br>"     |
| 132             | Kathera, VI<br>Bhitári, VII<br>Sonania   | h.s.<br>26 15 41<br>51 44 38<br>101 59 41 | 4° 695' 52.0<br>4° 944' 64.8<br>5° 0400' 52  | 49604<br>88034<br>109661   | 9.395<br>16.673<br>20.769  | 145             | Algi, VIII<br>Maharajpur, X<br>Chandeva               | 54 29 36<br>37 16 54<br>88 13 30 | 5° 0915' 39<br>4° 963' 16.1<br>5° 1806' 70   | 123461<br>91867<br>151590 | 23.383<br>17.399<br>28.710 | "<br>"<br>"     |

\* Base deduced by two sides and included angle. † Instrument not known.

| No. of Triangle | Station                                                | Corrected Plane Angle                   | Distance                         |                          |                            | No. of Triangle | Station                                            | Corrected Plane Angle                    | Distance                         |                            |                            | Theodolite used |
|-----------------|--------------------------------------------------------|-----------------------------------------|----------------------------------|--------------------------|----------------------------|-----------------|----------------------------------------------------|------------------------------------------|----------------------------------|----------------------------|----------------------------|-----------------|
|                 |                                                        |                                         | Log. feet                        | Feet                     | Miles                      |                 |                                                    |                                          | Log. feet                        | Feet                       | Miles                      |                 |
| 146             | Bhitári, VII<br>Algi, VIII<br>Gharabo                  | h.s.<br>30 32 59<br>37 18 8<br>112 9 2  | 4.836826<br>4.913236<br>5.007453 | 68679<br>81891<br>125156 | 13.007<br>15.510<br>23.704 | 159             | Maharájpur, X<br>Chandeva<br>Bharani               | h.s.<br>43 43 36<br>112 0 56             | 4.738086<br>4.964026<br>5.091529 | 54712<br>92051<br>123461   | 10.362<br>17.434<br>23.383 | 15              |
| 147             | Algi, VIII<br>Chandeva<br>Gharabo                      | h.s.<br>18 7 11<br>38 46 14<br>123 6 35 | 4.532876<br>4.836826<br>4.963161 | 34110<br>68679<br>91867  | 6.460<br>13.007<br>17.399  | 160             | Chandeva<br>Gharabo<br>Sonával Temple              | h.s.<br>99 35 6<br>50 53 20              | 4.834082<br>4.730006<br>4.532876 | 68247<br>53704<br>34110    | 12.926<br>10.171<br>6.460  | "               |
| 148             | Bhitári, VII<br>Daryapur, IX<br>Amra Fort              | "<br>55 23 31<br>66 1 15                | 4.944215<br>4.989586<br>4.959956 | 87946<br>97631<br>91192  | 16.656<br>18.491<br>17.271 | 161             | Algi, VIII<br>Chandeva<br>Ráon                     | h.s.<br>62 58 19<br>51 55 39<br>65 6 2   | 4.955303<br>4.901032<br>4.963161 | 90220<br>79732<br>91867    | 17.087<br>15.101<br>17.399 | "               |
| 149             | Bhitári, VII<br>Daryapur, IX<br>Bachondono Hill Temple | "<br>39 31 3<br>42 24 51                | 4.767948<br>4.793248<br>4.959956 | 58607<br>62122<br>91192  | 11.100<br>11.766<br>17.271 | 162             | Maharájpur, X<br>Chandeva<br>Ráon                  | h.s.<br>46 27 48<br>36 17 51<br>97 14 21 | 4.955303<br>4.867310<br>5.091529 | 90220<br>73673<br>123461   | 17.087<br>13.953<br>23.383 | "               |
| 150             | Bhitári, VII<br>Chandeva<br>Bachondono Hill Temple     | h.s.<br>58 33 44<br>36 4 57             | 4.954225<br>4.793248<br>5.021742 | 89996<br>62122<br>105134 | 17.045<br>11.766<br>19.912 | 163             | Daryapur, IX<br>Maharájpur, X<br>Gujára Hill Fort  | "<br>39 45 15<br>68 53 5                 | 5.007402<br>5.171380<br>5.178167 | 101719<br>148381<br>150719 | 19.265<br>28.103<br>28.545 | "               |
| 151             | Bhitári, VII<br>Daryapur, IX<br>Salun Hill Temple      | "<br>31 33 31<br>63 12 44               | 4.682272<br>4.912160<br>4.959956 | 47893<br>81688<br>91192  | 9.071<br>15.471<br>17.271  | 164             | Maharájpur, X<br>Chandeva<br>Gujára Hill Fort      | h.s.<br>78 17 45<br>44 5 17              | 5.155815<br>5.007402<br>5.091529 | 143158<br>101719<br>123461 | 27.113<br>19.265<br>23.383 | "               |
| 152             | Bhitári, VII<br>Chandeva<br>Salun Hill Temple          | h.s.<br>50 36 12<br>49 49 52            | 4.917034<br>4.912160<br>5.021742 | 82610<br>81688<br>105134 | 15.646<br>15.471<br>19.912 | 165             | Daryapur, IX<br>Maharájpur, X<br>Rágarh Hill Staff | "<br>25 52 39<br>24 45 48                | 4.929816<br>4.911964<br>5.178167 | 85078<br>81651<br>150719   | 16.113<br>15.464<br>28.545 | "               |
| 153             | Algi, VIII<br>Chandeva<br>Suru Hill Staff              | h.s.<br>19 44 50<br>48 25 27            | 4.524223<br>4.869419<br>4.963161 | 33437<br>74032<br>91867  | 6.333<br>14.021<br>17.399  | 166             | Maharájpur, X<br>Majhár, XIV<br>Rágarh Hill Staff  | "<br>47 27 45<br>51 25 54                | 4.904054<br>4.929816<br>5.031430 | 80178<br>85078<br>107505   | 15.185<br>16.113<br>20.361 | "               |
| 154             | Algi, VIII<br>Chandeva<br>Kamad Fort                   | h.s.<br>92 42 55<br>64 46 19            | 4.589769<br>5.006207<br>4.963161 | 38884<br>101440<br>91867 | 7.364<br>19.212<br>17.399  | 167             | Maharájpur, X<br>Majhár, XIV<br>Geurul Hill Staff  | "<br>49 17 23<br>23 7 58                 | 4.931876<br>4.646438<br>5.031430 | 85482<br>44304<br>107505   | 16.190<br>8.391<br>20.361  | "               |
| 155             | Daryapur, IX<br>Chandeva<br>Kamad Fort                 | h.s.<br>75 17 36<br>43 23 8             | 4.589769<br>4.441132<br>4.547395 | 38884<br>27614<br>35269  | 7.364<br>5.230<br>6.680    | 168             | Maharájpur, X<br>Chandeva<br>Geurul Hill Staff     | h.s.<br>32 20 49<br>15 24 16             | 4.950550<br>4.646438<br>5.091529 | 89238<br>44304<br>123461   | 16.901<br>8.391<br>23.383  | "               |
| 156             | Algi, VIII<br>Chandeva<br>Datia Palace                 | h.s.<br>13 15 31<br>34 52 54            | 4.451625<br>4.848440<br>4.963161 | 28289<br>70541<br>91867  | 5.358<br>13.360<br>17.399  | 169             | Majhár, XIV<br>Chandeva<br>Deogarh Hill Fort       | h.s.<br>69 46 39<br>13 33 43             | 5.155596<br>4.553364<br>5.180287 | 143086<br>35757<br>151456  | 27.100<br>6.772<br>28.685  | "               |
| 157             | Algi, VIII<br>Gharabo<br>Datia Palace                  | h.s.<br>31 22 42<br>77 2 10             | 4.576229<br>4.848440<br>4.836826 | 37690<br>70541<br>68679  | 7.138<br>13.360<br>13.007  | 170             | Majhár, XIV<br>Sáwichri, XV<br>Bhandauli           | "<br>25 16 22<br>132 38 54               | 4.889448<br>4.834146<br>5.125691 | 77526<br>68257<br>133564   | 14.683<br>12.927<br>25.296 | "               |
| 158             | Algi, VIII<br>Chandeva<br>Bharani                      | h.s.<br>35 58 5<br>44 29 54<br>99 32 1  | 4.738086<br>4.814849<br>4.963161 | 54712<br>65290<br>91867  | 10.362<br>12.366<br>17.399 | 171             | Athgath, XIX<br>Sherpur, XXI<br>Báh                | "<br>34 1 24<br>106 10 4                 | 4.722951<br>4.664439<br>4.899090 | 52839<br>46178<br>79267    | 10.007<br>8.746<br>15.013  | 12              |

\* Base deduced by two sides and included angle.

SECONDARY TRIANGULATION. TRIANGLES.

21—j.

| No. of Triangle | Station                                                 | Corrected Plane Angle                   | Distance                                     |                           |                               | No. of Triangle | Station                                                   | Corrected Plane Angle       | Distance                                     |                           |                              | Theodolite used |
|-----------------|---------------------------------------------------------|-----------------------------------------|----------------------------------------------|---------------------------|-------------------------------|-----------------|-----------------------------------------------------------|-----------------------------|----------------------------------------------|---------------------------|------------------------------|-----------------|
|                 |                                                         |                                         | Log. feet                                    | Feet                      | Miles                         |                 |                                                           |                             | Log. feet                                    | Feet                      | Miles                        |                 |
| 172             | Sherpur, XXI<br>Bāh<br>Amānpur Temple                   | s.<br>9 14 50<br>56 9 23                | 3° 07' 02.63<br>4° 08' 36.33<br>4° 72' 29.51 | 9338<br>48265<br>52839    | 1° 769<br>9° 141<br>10° 007   | 12<br>"         | Jamālpur, XXVII<br>Sahaswān Platform<br>Kādirbāri         | s.<br>14 1 29<br>152 18 26  | 4° 72' 23.31<br>4° 71' 12.63<br>5° 00' 50.06 | 52751<br>51435<br>101159  | 9° 991<br>9° 742<br>19° 159  | 18<br>+         |
| 173             | Sherpur, XXI<br>Baragaon, XXIII<br>Shikohabad           | s.<br>22 25 43<br>117 5 56              | 4° 81' 05.28<br>4° 57' 9.59<br>4° 94' 7.26   | 64644<br>37998<br>88660   | 12° 243<br>7° 197<br>16° 792  | 18<br>"         | Jamālpur, XXVII<br>Kādirbāri<br>Soron House               | s.<br>7 47 23<br>24 23 55   | 4° 11' 68.37<br>4° 60' 08.13<br>4° 71' 12.63 | 13087<br>39885<br>51435   | 2° 479<br>7° 554<br>9° 742   | 18<br>7         |
| 174             | Sherpur, XXI<br>Shikohabad<br>Batesar House             | s.<br>98 46 51<br>44 27 27              | 4° 79' 75.84<br>4° 64' 80.37<br>4° 57' 9.59  | 62746<br>44467<br>37998   | 11° 884<br>8° 422<br>7° 197   | 12<br>18        | Jamālpur, XXVIII<br>Soron House<br>Debrai Fort            | s.<br>32 20 2<br>77 7 53    | 4° 34' 00.94<br>4° 58' 63.00<br>4° 60' 08.13 | 21882<br>38574<br>39885   | 4° 144<br>7° 306<br>7° 554   | 18<br>7         |
| 175             | Firozabad, XXII<br>Pondri, XXIV<br>Kotla                | s.<br>23 18 58<br>16 52 29<br>139 48 33 | 4° 85' 49.06<br>4° 72' 02.43<br>5° 06' 72.11 | 71599<br>52510<br>116738  | 13° 560<br>9° 945<br>22° 109  | "<br>7<br>"     | Sankrāo, XXVIII<br>Parauli, XXXI<br>Rānghat House         | "<br>14 13 26<br>27 14 10   | 4° 43' 65.32<br>4° 70' 60.48<br>4° 86' 70.28 | 27323<br>50892<br>73626   | 5° 175<br>9° 639<br>13° 944  | 18<br>"         |
| 176             | Baragaon, XXIII<br>Shikohabad<br>Labhauwa Palace        | s.<br>19 14 39<br>64 6 40               | 4° 33' 14.35<br>4° 76' 75.25<br>4° 81' 05.28 | 21450<br>58550<br>64644   | 4° 063<br>11° 089<br>12° 243  | 18<br>7         | Sheopuri, XLVIII<br>Mahesari, LII<br>Bijnor               | s.<br>30 39 45<br>121 31 21 | 4° 66' 57.74<br>4° 70' 43.66<br>4° 92' 74.74 | 46321<br>50625<br>84620   | 8° 773<br>9° 588<br>16° 027  | 16<br>7         |
| 177             | Baragaon, XXIII<br>Kilārmāo, XXV<br>Sakti Temple        | "<br>8 10 37<br>13 52 33                | 4° 62' 88.28<br>4° 85' 57.17<br>5° 05' 03.99 | 42543<br>71733<br>112305  | 8° 057<br>13° 586<br>21° 270  | 18<br>"         | Godhna, XLIX<br>Chāndīpahār, LIV<br>Sūrajpahār            | "<br>118 8 25<br>56 25 0    | 4° 21' 05.60<br>5° 17' 88.61<br>5° 15' 41.81 | 16239<br>150960<br>142620 | 3° 076<br>28° 591<br>27° 011 | "<br>"          |
| 178             | Pondri, XXIV<br>Kilārmāo, XXV<br>Nandauli House         | "<br>39 39 18<br>19 51 54               | 4° 96' 17.44<br>4° 68' 80.42<br>5° 09' 22.21 | 91568<br>48738<br>123658  | 17° 342<br>9° 234<br>23° 420  | "<br>"          | Chāndīpahār, LIV<br>Sūrajpahār<br>Kankhal Solitary Temple | "<br>82 7 45<br>39 50 38    | 4° 27' 70.01<br>4° 08' 86.65<br>4° 21' 05.60 | 18963<br>12265<br>16239   | 3° 591<br>2° 323<br>3° 076   | "<br>"          |
| 179             | Salimpur, XXVI<br>Sankrāo, XXVIII<br>Dādo House         | "<br>17 15 53<br>29 55 20               | 4° 59' 11.72<br>4° 81' 66.75<br>4° 98' 41.72 | 39010<br>65565<br>96421   | 7° 388<br>12° 418<br>18° 262  | "<br>"          | Chāndīpahār, LIV<br>Sūrajpahār<br>Kankhal Temple          | "<br>56 23 15<br>40 44 48   | 4° 13' 44.76<br>4° 02' 86.59<br>4° 21' 05.60 | 13629<br>10682<br>16239   | 2° 581<br>2° 023<br>3° 076   | "<br>"          |
| 180             | Jamālpur, XXVII<br>Sankrāo, XXVIII<br>Sahaswān Platform | "<br>33 21 35<br>53 2 41                | 4° 84' 26.81<br>5° 00' 50.06<br>5° 10' 15.47 | 69612<br>101159<br>126342 | 13° 184<br>19° 159<br>23° 928 | "<br>"          | Chāndīpahār, LIV<br>Sūrajpahār<br>Jawālpur House          | "<br>72 12 13<br>39 32 13   | 4° 37' 46.65<br>4° 38' 54.15<br>4° 21' 05.60 | 23695<br>24289<br>16239   | 4° 488<br>4° 600<br>3° 076   | "<br>"          |

NOTE.—Stations Sheopuri, XLVIII, Godhna, XLIX, Mahesari, LII, and Chāndīpahār, LIV appertain to the Great Arc Meridional Series—Sec 24° to 30°.  
+ Instrument not known.

December 1878.

J. B. N. HENNESSEY,  
In charge of Computing Office.

AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL,  
 PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

The following table contains, in the first column, the name of each Principal, Principal-Auxiliary, or Secondary Station, at which azimuths of surrounding Points have been measured; immediately followed by those azimuths. The second column contains the number of the triangle which gives the distance between the Station and the Point.

| Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance |
|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|
| ARMOI h.s.                                          | o' "                            | ALGI, VIII                                          | o' "                            | ANDHIARI, IV                                        | o' "                            |                                                     |                                 |
| Barodia                                             | h.s. 1 28 40                    | Kamad Fort                                          | s. 241 42 47                    | Dhandkua, III                                       | 256 21 53 29                    |                                                     | 4                               |
| Mandri                                              | " 18 4 54                       | Bhitari, VII                                        | 274 37 19 90                    | Birari                                              | h.s. 259 15 31                  |                                                     | 116                             |
| Maltaun                                             | " 31 36 55                      | Iahar Hill Staff                                    | 279 32 33                       | Patna, I                                            | 314 31 4 34                     |                                                     | 4                               |
| Patna, I                                            | 282 30 56                       | Jhansi Fort                                         | 280 56 32                       | Bara Dongra Hill Temple                             | 314 57 51                       |                                                     | 94                              |
|                                                     |                                 | Gwali, V                                            | 349 2 5 49                      | Ero                                                 | " 321 7 57                      |                                                     | 99                              |
| AKBARPUR, XLIV                                      |                                 | AMARPUR, h.s.                                       |                                 | ATHGATH, XIX                                        |                                 |                                                     |                                 |
| Sirsa, XL                                           | 28 18 1 77                      | Andhiari, IV                                        | 6 21 14                         | Gurmi, XVII                                         | 41 37 49 70                     |                                                     | 21                              |
| Milk, XLIII                                         | 88 51 39 68                     | Ranba Hill Staff                                    | 46 15 16                        | Panahat, XX                                         | 104 34 14 17                    |                                                     | 22                              |
| Sarkara, XLV                                        | 153 52 46 38                    | Gurar                                               | h.s. 57 34 33                   | Bah                                                 | s. 126 14 50                    |                                                     | 171                             |
| Nandi, XLVII                                        | 210 21 47 83                    | Gwali, V                                            | 233 46 36                       | Sherpur, XXI                                        | 166 3 22 33                     |                                                     | 23                              |
| Bhatauli, XLII                                      | 337 26 38 94                    | Pabba                                               | 262 41 3                        | Bhind, XVIII                                        | 342 9 59 35                     |                                                     | 21                              |
| ALGI, VIII                                          |                                 | Talapahari                                          | " 349 6 57                      | ATORA, XXXIX                                        |                                 |                                                     |                                 |
| Ghatoli Hill Staff                                  | 19 34 26                        |                                                     |                                 | Bansgopal, XXXV                                     | 26 46 8 24                      |                                                     | 41                              |
| Narwar, XI                                          | 107 56 28 36                    | ANDHIARI, IV                                        |                                 | Kandarki, XXXVIII                                   | 94 45 31 91                     |                                                     | 41                              |
| Raon                                                | h.s. 156 13 42                  | Gurar                                               | h.s. 157 16 11                  | Sirsa, XL                                           | 159 11 38 43                    |                                                     | 44                              |
| Maharajpur, X                                       | 164 42 24 79                    | Amarpur                                             | " 186 20 4                      | Bhatauli, XLII                                      | 206 4 5 48                      |                                                     | 45                              |
| Bharauni                                            | 183 13 56                       | Gwali, V                                            | " 200 8 19 73                   | Barauli, XXXVII                                     | 325 45 25 43                    |                                                     | 43                              |
| Suru Hill Staff                                     | 199 27 11                       | Jhakaura                                            | " 201 20 54                     | BAH s.                                              |                                 |                                                     |                                 |
| Datia Palace                                        | 205 56 30                       | Pabba                                               | " 208 0 37                      | Amarnpur Temple                                     | 143 52 17                       |                                                     | 172                             |
| Chandeva                                            | 219 12 1                        | Kalaphar                                            | " 214 26 52                     | Sherpur, XXI                                        | 200 1 40                        |                                                     | 171                             |
| Daryapur, IX                                        | " 230 58 42 71                  | Barh                                                | " 239 31 46                     | Athgath, XIX                                        | 306 11 44                       |                                                     | 171                             |
| Gharabo                                             | " 237 19 12                     |                                                     |                                 |                                                     |                                 |                                                     |                                 |

| Name of station with azimuths of surrounding points                                                                                  | No. of triangles running distance             | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                               | No. of triangles running distance                                                                           | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                                      | No. of triangles running distance                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| BANARSA h.s.<br>Pabba<br>Gwáli, V<br>Dhandkúa, III                                                                                   | 103<br>102<br>102                             | BHANDAULI s.<br>Sánichri, XV<br>Majhár, XIV                                                                                                                                                                                                                                                       | 170<br>170                                                                                                  | BIJNOR s.<br>Sheopuri, XLVIII†<br>Mahesari, LIII†                                                                                                                                                                                                                                                        | 185<br>185                                                                                                          |
| BANSOPAL, XXXV<br>Rajauli, XXXIII<br>Chandanpur, XXXVI<br>Kandarkí, XXXVIII<br>Atora, XXXIX<br>Barauli, XXXVII<br>Mehtara, XXXIV     | 38<br>39<br>40<br>41<br>42<br>38              | BHARAUNI h.s.<br>Algi, VIII<br>Maharajpur, X<br>Chandera                                                                                                                                                                                                                                          | 158<br>159<br>158                                                                                           | BRARI h.s.<br>Bara Dongra Hill Temple<br>Ero<br>Andhiári, IV<br>Kálapahár                                                                                                                                                                                                                                | 116<br>117<br>116<br>118                                                                                            |
| BARAGAON, XXIII<br>Sherpur, XXI<br>Shikohabad<br>Labhauwa Palace<br>Firozabad, XXII<br>Pondri, XXIV<br>Kilárnáo, XXV<br>Sakít Temple | 25<br>173<br>176<br>25<br>26<br>27<br>177     | BHATAULI, XLII<br>Atora, XXXIX<br>Sirsa, XL<br>Akbarpur, XLIV                                                                                                                                                                                                                                     | 45<br>45<br>46                                                                                              | BUDHON, III*<br>Patna, I<br>Pandúa<br>Samaspur<br>Sagom<br>Tinsmá, VII*                                                                                                                                                                                                                                  | 1<br>62<br>60<br>58<br>1                                                                                            |
| BARAULI, XXXVII<br>Mehtara, XXXIV<br>Bánsopál, XXXV<br>Atora, XXXIX                                                                  | 42<br>42<br>43                                | BHERO h.s.<br>Lakhanjhr<br>Tinsmá, VII*<br>Singan                                                                                                                                                                                                                                                 | 78<br>78<br>79                                                                                              | CHANDANPUR, XXXVI<br>Kandarkí, XXXVIII<br>Bánsopál, XXXV<br>Rajauli, XXXIII                                                                                                                                                                                                                              | 40<br>39<br>39                                                                                                      |
| BARH h.s.<br>Andhiári, IV<br>Mohangarh Fort<br>Mora<br>Ratangawan<br>Bijli<br>Dhandkúa, III<br>Bila Hill Staff                       | 106<br>114<br>107<br>112<br>109<br>106<br>110 | BRIND, XVIII<br>Jhánkri, XVI<br>Gúrmi, XVII<br>Athgath, XIX                                                                                                                                                                                                                                       | 20<br>20<br>21                                                                                              | CHANDEVA h.s.<br>Gharabo<br>Algi, VIII<br>Datia Palace<br>Bharau<br>Suru Hill Staff<br>Ráon<br>Sonáwal Temple<br>Maharajpur, X<br>Genrol Hill Staff<br>Gujára Hill Fort<br>Majhár, XIV<br>Deogarh Hill Fort<br>Daryapur, IX<br>Salun Hill Temple<br>Bachondono Hill Temple<br>Kamad Fort<br>Bhitári, VII | 147<br>144<br>156<br>158<br>153<br>161<br>160<br>145<br>168<br>164<br>169<br>169<br>155<br>152<br>150<br>154<br>144 |
| BARODIA h.s.<br>Mandri<br>Ahmoi<br>Patna, I<br>Pandúa<br>Samaspur                                                                    | 88<br>84<br>80<br>81<br>80                    | BHITIARI, VII<br>Sonania<br>Orcha Temple<br>Gwáli, V<br>Sanyer Hill Staff<br>Jhánsi Fort<br>Lahar Hill Staff<br>Algi, VIII<br>Gharabo<br>Chandera<br>Daryapur, IX<br>Salun Hill Temple<br>Bachondono Hill Temple<br>Amra Fort<br>Korar Hill Fort<br>Kathera, VI<br>Mora<br>Barwa Sagar High Tower | 132<br>143<br>7<br>183<br>135<br>137<br>8<br>146<br>144<br>9<br>151<br>149<br>148<br>141<br>7<br>105<br>140 | CHANDIPAHAR, LIV†<br>Godhna, XLIX†<br>Kankhal Solitary Temple<br>Jawálapur House<br>Kankhal Temple<br>Súrjapahar                                                                                                                                                                                         | 198<br>187<br>201<br>188<br>186                                                                                     |
| BENAIKA TEMPLE s<br>Jalampur<br>Morári Hill Tree<br>Jagthar Hill Staff                                                               | 73<br>75<br>73                                | BILI h.s.<br>Dhandkúa, III<br>Barh<br>Manau                                                                                                                                                                                                                                                       | 108<br>109<br>108                                                                                           |                                                                                                                                                                                                                                                                                                          |                                                                                                                     |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral. † Of the Great Arc Meridional Series—Section 24° to 30°.

BUDHON MERIDIONAL SERIES.

| Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance |
|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|
| DARGAWA, II<br>Tinsmál, VII*                        | 2                               | DHOBAN h.s.<br>Tinsmál, VII*                        | 64                              | GWALI, V<br>Andhiári, IV                            | 5                               | JALAMPUR h.s.<br>Singan                             | 76                              |
| Dhoban                                              | 65                              | Jálapur                                             | 71                              | Talapahári                                          | 128                             | Bensaika Temple                                     | 73                              |
| Lakhanjír                                           | 66                              | Lakhanjír                                           | 71                              | Amarpur                                             | 120                             | Lakhanjír                                           | 70                              |
| Patna, I                                            | 2                               | Patna, I                                            | 64                              | Ghatoli Hill Staff                                  | 139                             | Dhoban                                              | 71                              |
| Sarkaura                                            | 95                              | Dargawa, II                                         | 65                              | Algi, VIII                                          | 8                               | Tinsmál, VII*                                       | 70                              |
| Dhandkúa, III                                       | 3                               | Ero h.s.                                            |                                 | Lahar Hill Staff                                    | 187                             | Morári Hill Tree                                    | 74                              |
| Tehri Palace                                        | 97                              | Andhiári, IV                                        | 99                              | Jhánsi Fort                                         | 135                             | Jagthar Hill Staff                                  | 72                              |
| Mamaun                                              | 96                              | Kálapahár                                           | 119                             | Sanyer Hill Staff                                   | 183                             |                                                     |                                 |
|                                                     |                                 | Birári                                              | 117                             | Bhitári, VII                                        | 7                               |                                                     |                                 |
|                                                     |                                 | Dhandkúa, III                                       | 99                              | Sonania                                             | 131                             |                                                     |                                 |
| DARYAPUR, IX                                        | 155                             | Firozabad, XXII                                     | 24                              | Jiár Hill Staff                                     | 126                             |                                                     |                                 |
| Kamad Fort                                          | 9                               | Panáhat, XX                                         | 26                              | Kathera, VI                                         | 6                               |                                                     |                                 |
| Algi, VIII                                          | 155                             | Pondri, XXIV                                        | 175                             | Mora                                                | 104                             |                                                     |                                 |
| Chandeva                                            | 151                             | Kotla                                               | 25                              | Banarsa                                             | 102                             |                                                     |                                 |
| Maharajpur, X                                       | 10                              | Baragon, XXIII                                      | 25                              | Dhandkúa, III                                       | 5                               |                                                     |                                 |
| Rángarh Hill Staff                                  | 144                             | Sherpur, XXI                                        | 24                              | Pabba                                               | 101                             |                                                     |                                 |
| Gujára Hill Fort                                    | 157                             |                                                     |                                 |                                                     |                                 |                                                     |                                 |
| Majhár, XIV                                         | 159                             | Gharabo h.s.                                        | 146                             | HALDAUR, XLVI                                       | 56                              |                                                     |                                 |
| Amra Fort                                           | 273                             | Algi, VIII                                          | 146                             | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
| Salun Hill Temple                                   | 276                             | Soniwal Temple                                      | 160                             | Maheśari, LII+                                      | 155                             |                                                     |                                 |
| Bachondono Hill Temple                              | 297                             | Datia Palace                                        | 157                             | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
| Korár Hill Fort                                     | 313                             | Chandeva                                            | 147                             | Sarkára, XLV                                        | 273                             |                                                     |                                 |
| Bhitári, VII                                        | 339                             | Bhitári, VII                                        | 146                             | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
| DEBRAI Fort s.                                      | 183                             |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
| Soron House                                         | 183                             |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
| Jamálpur, XXVII                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | HALDAUR, XLVI                                       |                                 |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sheopuri, XLVIII+                                   | 99                              |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Maheśari, LII+                                      | 155                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Harpálsid, XLVIII                                   | 213                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Sarkára, XLV                                        | 273                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 | Múlk, XLIII                                         | 325                             |                                                     |                                 |
|                                                     |                                 |                                                     |                                 |                                                     |                                 |                                                     |                                 |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral. † Of the Great Arc Meridional Series—Section  $24^{\circ}$  to  $30^{\circ}$ . ‡ Of the North-East Longitudinal Series—



| Name of station with azimuths of surrounding points                                               | No. of triangle giving distance | Name of station with azimuths of surrounding points                                                                                                                                                   | No. of triangle giving distance                                            | Name of station with azimuths of surrounding points                                                                                                                                                   | No. of triangle giving distance                                            | Name of station with azimuths of surrounding points | No. of triangle giving distance |
|---------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|
| JAWALAPUR HOUSE S.<br>Sursipahar<br>Chandipahar, LIV*                                             | 189<br>189<br>189               | KARIAMAI, XXXII<br>Sarsotha, XXIX<br>Sakrota, XXX<br>Mehtra, XXXIV                                                                                                                                    | 33<br>33<br>34                                                             | MAHARAJPUR, X<br>Narwar, XI<br>Karua, XII<br>Raipur, XIII<br>Majhar, XIV<br>Guajara Hill Fort<br>Rangarh Hill Staff<br>Genrol Hill Staff<br>Daryapur, IX<br>Chandeva<br>Bharani<br>Algi, VIII<br>Raon | 13<br>14<br>12<br>11<br>163<br>165<br>167<br>10<br>145<br>159<br>10<br>162 |                                                     |                                 |
| JHAKURA h.s.<br>Andhiari, IV<br>Gurar<br>Pabba                                                    | 124<br>124<br>125               | KATHERA, VI<br>Dhandkua, III<br>Mora<br>Gwali, V<br>Jiar Hill Staff<br>Sonania<br>Barwa Sagar High Tower<br>Bhitari, VII<br>Korar Hill Fort                                                           | 6<br>127<br>6<br>127<br>131<br>140<br>7<br>141                             |                                                                                                                                                                                                       |                                                                            |                                                     |                                 |
| JHANKRI, XVI<br>Majhar, XIV<br>Raipur, XIII<br>Sanichri, XV<br>Garmi, XVII<br>Blind, XVIII        | 16<br>16<br>17<br>19<br>20      | KILARMAO, XXV<br>Baragaon, XXIII<br>Pondri, XXIV<br>Nandauli House<br>Salimpur, XXVI<br>Jamalpur, XXVII<br>Sakit Temple                                                                               | 27<br>27<br>178<br>28<br>29<br>177                                         |                                                                                                                                                                                                       |                                                                            |                                                     |                                 |
| KADREBARI S.<br>Sahaswan Platform<br>Jamalpur, XXVII<br>Soron House                               | 181<br>181<br>182               | KOTLA S.<br>Firozabad, XXII<br>Pondri, XXIV                                                                                                                                                           | 175<br>175                                                                 |                                                                                                                                                                                                       |                                                                            |                                                     |                                 |
| KALAPAHAR h.s.<br>Andhiari, IV<br>Birari<br>Ero                                                   | 118<br>118<br>119               | LAKHANJHUR h.s.<br>Singan<br>Bhero<br>Kali<br>Patna, I<br>Mahrota<br>Dargawa, II<br>Dhoban<br>Tinsmal, VII+<br>Jalampur                                                                               | 77<br>78<br>68<br>67<br>82<br>66<br>71<br>66<br>70                         |                                                                                                                                                                                                       |                                                                            |                                                     |                                 |
| KALI h.s.<br>Patna, I<br>Lakhanjhir<br>Tinsmal, VII+                                              | 69<br>68<br>68                  | LUT, XLI<br>Milih, XLIII<br>Sira, XL<br>Kandarki, XXXVIII                                                                                                                                             | 49<br>48<br>48                                                             |                                                                                                                                                                                                       |                                                                            |                                                     |                                 |
| KAMAD FORT S.<br>Algi, VIII<br>Chandeva<br>Daryapur, IX                                           | 154<br>154<br>155               | MABEGARH, I†<br>Mahesari, LII*<br>Harpalsid, XLVIII                                                                                                                                                   | 57<br>57                                                                   |                                                                                                                                                                                                       |                                                                            |                                                     |                                 |
| KANDARKI, XXXVIII<br>Chandanpur, XXXVI<br>Lut, XLI<br>Sira, XL<br>Atora, XXXIX<br>Bansgopal, XXXV | 40<br>48<br>44<br>41<br>40      | MAHARAJPUR, X<br>Narwar, XI<br>Karua, XII<br>Raipur, XIII<br>Majhar, XIV<br>Guajara Hill Fort<br>Rangarh Hill Staff<br>Genrol Hill Staff<br>Daryapur, IX<br>Chandeva<br>Bharani<br>Algi, VIII<br>Raon | 13<br>14<br>12<br>11<br>163<br>165<br>167<br>10<br>145<br>159<br>10<br>162 |                                                                                                                                                                                                       |                                                                            |                                                     |                                 |
| KARATA, XII<br>Narwar, XI<br>Raipur, XIII<br>Maharajpur, X                                        | 14<br>15<br>14                  | MAHARAJPUR, X<br>Narwar, XI<br>Karua, XII<br>Raipur, XIII<br>Majhar, XIV<br>Guajara Hill Fort<br>Rangarh Hill Staff<br>Genrol Hill Staff<br>Daryapur, IX<br>Chandeva<br>Bharani<br>Algi, VIII<br>Raon | 13<br>14<br>12<br>11<br>163<br>165<br>167<br>10<br>145<br>159<br>10<br>162 |                                                                                                                                                                                                       |                                                                            |                                                     |                                 |

\* Of the Great Arc Meridional Series—Section 24° to 30°. † Of the Calcutta Longitudinal Series of the South-East Quadrilateral. ‡ Of the North-East Longitudinal Series.

| Name of station with azimuths of surrounding points                                                                                                                   | No. of triangles giving distance                                          | Name of station with azimuths of surrounding points                                                                                  | No. of triangles giving distance                             | Name of station with azimuths of surrounding points                                                                                                                                                                                       | No. of triangles giving distance                                                        | Name of station with azimuths of surrounding points                                                                                                                                                                           | No. of triangles giving distance                                                                                                                                                                 |                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| MANDRI h.s.<br>Maltaun<br>Ahmoi<br>Gorur<br>Pandua<br>Barodia                                                                                                         | 91<br>89<br>90<br>88<br>88                                                | h.s.<br>" "<br>" "<br>" "<br>" "                                                                                                     | 182 43 30<br>198 4 11<br>237 39 19<br>260 36 45<br>337 21 13 | PANAHAT, XX<br>Firozabad, XXII<br>Sherpur, XXI<br>Athgath, XIX<br>Gúrimi, XVII                                                                                                                                                            | 24<br>23<br>22<br>22                                                                    | 183 4 0 07<br>241 30 42 16<br>284 25 9 94<br>335 46 25 06                                                                                                                                                                     | RAEPUR, XIII<br>Karaia, XII<br>Sánichri, XV<br>Jhánkri, XVI<br>Majhár, XIV<br>Maharājpur, X                                                                                                      | 15<br>17<br>16<br>12<br>12              |
| MEHTRA, XXXIV<br>Sakrora, XXX<br>Rajauli, XXXIII<br>Bánsopál, XXXV<br>Barauli, XXXVII<br>Kariámái, XXXII                                                              | 34<br>35<br>38<br>42<br>34                                                | 29 30 14 39<br>91 44 50 33<br>151 38 54 62<br>210 8 24 59<br>319 53 7 70                                                             | h.s.<br>" "<br>" "<br>" "<br>" "                             | PANDUA h.s.<br>Samaspur<br>Budhon, III*<br>Barodia<br>Mandri<br>Gorur<br>Patna, I<br>Dongra Hill Temple<br>Mahroza<br>Rámpura Hill Staff                                                                                                  | 63<br>62<br>81<br>88<br>90<br>62<br>85<br>83<br>87                                      | h.s.<br>2 39 45<br>35 12 5<br>49 51 27<br>80 39 45<br>97 5 31<br>140 46 2<br>156 5 45<br>231 0 46<br>303 38 41                                                                                                                | RAJAU, XXXIII<br>Parauli, XXXI<br>Chandanpur, XXXVI<br>Bánsopál, XXXV<br>Mehtra, XXXIV<br>Sakrora, XXX                                                                                           | 37<br>39<br>88<br>85<br>35              |
| MILK, XLIII<br>Lót, XLI<br>Haldaur, XLVI<br>Sarkára, XLV<br>Akbarpur, XLIV<br>Sirsa, XL                                                                               | 49<br>51<br>50<br>47<br>47                                                | 29 6 14 71<br>145 33 25 67<br>208 31 10 07<br>268 45 22 83<br>329 52 8 21                                                            | h.s.<br>" "<br>" "<br>" "<br>" "                             | PARAULI, XXXI<br>Rajauli, XXXIII<br>Sakrora, XXX<br>Rámghat House<br>Sankráo, XXVIII                                                                                                                                                      | 37<br>36<br>184<br>36                                                                   | 196 5 9 12<br>252 13 5 83<br>279 28 36<br>306 42 45 71                                                                                                                                                                        | RAON h.s.<br>Maharājpur, X<br>Chandeva<br>Algi, VIII                                                                                                                                             | 162<br>161<br>161                       |
| MORA h.s.<br>Dhandkúa, III<br>Barh<br>Gwáli, V<br>Jár Hill Staff<br>Bhitári, VII<br>Kathera, VI                                                                       | 104<br>107<br>104<br>126<br>105<br>127                                    | 14 46 28<br>41 31 20<br>100 20 7<br>155 33 38<br>169 3 1<br>224 43 6                                                                 | h.s.<br>" "<br>" "<br>" "<br>" "                             | PATNA, I<br>Barodia<br>Budhon, III*<br>Ahmoi<br>Bara Dongra Hill Temple<br>Andhiári, IV<br>Dongra Hill Temple<br>Dhandkúa, III<br>Dargawa, II<br>Mahroza<br>Dhoban<br>Lakhanjhar<br>Tinsmál, VII*<br>Pandua<br>Káli<br>Samaspur<br>Sagoni | 80<br>1<br>84<br>93<br>4<br>85<br>3<br>2<br>82<br>64<br>67<br>1<br>62<br>69<br>60<br>59 | h.s.<br>18 17 59<br>20 6 43 66<br>102 32 0<br>133 45 52<br>134 40 45 12<br>183 48 50<br>191 29 31 04<br>232 13 8 87<br>254 59 18<br>281 46 25<br>292 40 52<br>301 42 33 71<br>320 44 49<br>321 36 54<br>344 25 3<br>345 56 36 | SAGONI h.s.<br>Budhon, III*<br>Patna, I<br>Samaspur<br>Tinsmál, VII*<br>SAKORA, XXX<br>Sankráo, XXVIII<br>Parauli, XXXI<br>Rajauli, XXXIII<br>Mehtra, XXXIV<br>Kariámái, XXXII<br>Sarsotha, XXIX | 58<br>59<br>61<br>58                    |
| NARWAR, XI<br>Karia, XII<br>Maharājpur, X<br>Algi, VIII                                                                                                               | 14<br>13<br>13                                                            | 194 46 48 35<br>225 39 28 46<br>287 45 14 56                                                                                         | h.s.<br>" "<br>" "                                           | PONDRI, XXIV<br>Firozabad, XXII<br>Salimpur, XXVI<br>Nandauli House<br>Kilárnáo, XXV<br>Baragon, XXIII<br>Kotla                                                                                                                           | 26<br>28<br>178<br>27<br>26<br>175                                                      | 2 28 55 44<br>196 53 12 52<br>215 9 44<br>254 49 1 93<br>308 46 36 39<br>345 36 26                                                                                                                                            | SALIMPUR, XXVI<br>Pondri, XXIV<br>Dádo House<br>Sankráo, XXVIII<br>Jamálpur, XXVII<br>Kilárnáo, XXV                                                                                              | 32<br>36<br>35<br>34<br>33<br>32        |
| PABBA h.s.<br>Andhiári, IV<br>Jhakaúra<br>Talapahári<br>Gurur<br>Anarpur<br>Gwáli, V<br>Sanyer Hill Staff<br>Ratangawan<br>Banarsa<br>Mohangarh Fort<br>Dhandkúa, III | 100<br>125<br>128<br>122<br>121<br>101<br>134<br>111<br>103<br>118<br>100 | 28 6 35<br>35 40 37<br>53 37 41<br>69 40 11<br>82 45 51<br>152 49 52<br>198 53 19<br>282 45 26<br>295 5 16<br>297 47 25<br>322 58 39 | h.s.<br>" "<br>" "<br>" "<br>" "<br>" "                      | BARODIA h.s.<br>Budhon, III*<br>Barodia                                                                                                                                                                                                   | 26<br>28<br>178<br>27<br>26<br>175                                                      | 16 56 10 40<br>166 41 34<br>183 57 26 76<br>264 25 5 14<br>313 45 14 08                                                                                                                                                       | SAMASPUR h.s.<br>Budhon, III*<br>Barodia                                                                                                                                                         | 28<br>179<br>30<br>29<br>28<br>60<br>80 |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

## AZIMUTHS OF STATIONS AND INTERSECTED POINTS.

27—J.

| Name of station with azimuths of surrounding points                                                                                                         | No. of triangle giving distance                 | Name of station with azimuths of surrounding points                                  | No. of triangle giving distance                  | Name of station with azimuths of surrounding points                                                                                                                         | No. of triangle giving distance                                   | Name of station with azimuths of surrounding points                                                                                        | No. of triangle giving distance                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| SAMASPUR h.s.<br>Patna, I<br>Pandua<br>Rampura Hill Staff<br>Sagoni                                                                                         | 60<br>63<br>87<br>61                            | SARSOTHA, XXIX<br>Sakora, XXX<br>Kariamai, XXXII<br>Jamalpur, XXVII                  | 32<br>83<br>81                                   | SIRSA, XL<br>Bhatauli, XLII<br>Athora, XXXIX                                                                                                                                | 45<br>44                                                          | SARATHA, XLIX<br>Sakora, XXX<br>Kariamai, XXXII<br>Jamalpur, XXVII                                                                         | 60<br>63<br>87<br>61                            |
| SANTOHR, XV<br>Raipur, XIII<br>Gurmi, XVII<br>Jhankri, XVI<br>Majhar, XIV<br>Bhandauli                                                                      | 17<br>19<br>17<br>18<br>170                     | SHEOPUR, XLVIII*<br>Mahesari, LII*<br>Bijnor<br>Haldaur, XLVI                        | 56<br>185<br>56                                  | SONANIA h.s.<br>Gwali, V<br>Orehha Temple<br>Bhitari, VII<br>Kathera, VI                                                                                                    | 131<br>143<br>132<br>131                                          | SHEOPUR, XXI<br>Bali<br>Amampur Temple<br>Batesar House<br>Panahat, XX<br>Firozabad, XXII<br>Shikohabad<br>Baragaon, XXIII<br>Athgath, XIX | 170<br>17<br>19<br>17<br>18<br>170              |
| SANKRAO, XXVIII<br>Salampur, XXVI<br>Dado House<br>Ramghat House<br>Parauli, XXXI<br>Sakora, XXX<br>Sarsottha, XXIX<br>Sahaswan Platform<br>Jamalpur, XXVII | 30<br>179<br>184<br>36<br>32<br>31<br>180<br>80 | SHIKOHABAD s.<br>Batesar House<br>Labhauna Palace<br>Baragaon, XXIII<br>Sherpur, XXI | 171<br>172<br>174<br>23<br>24<br>173<br>25<br>23 | SURAJPAHAR h.s.<br>Kankhal Solitary Temple<br>Kankhal Temple<br>Godhna, XLIX*<br>Jawalapur House<br>Chandpahar, LIV*                                                        | 187<br>188<br>186<br>189<br>186                                   | SHIKOHABAD s.<br>Batesar House<br>Labhauna Palace<br>Baragaon, XXIII<br>Sherpur, XXI                                                       | 30<br>179<br>184<br>36<br>32<br>31<br>180<br>80 |
| SARKARA, XLV<br>Mili, XLIII<br>Haldaur, XLVI<br>Harpalsid, XLVIII<br>Nandi, XLVII<br>Akbarpur, XLIV                                                         | 50<br>51<br>52<br>53<br>50                      | SINGAN h.s.<br>Bhero<br>Lakhanjhar<br>Jalampur<br>Tinsmal, VIII†                     | 79<br>77<br>76<br>76                             | TALAPAHARI h.s.<br>Ranha Hill Staff<br>Amarpur<br>Gwali, V<br>Pabba                                                                                                         | 130<br>129<br>128<br>128                                          | SINGAN h.s.<br>Bhero<br>Lakhanjhar<br>Jalampur<br>Tinsmal, VIII†                                                                           | 50<br>51<br>52<br>53<br>50                      |
| SARKARA h.s.<br>Dhandkua, III<br>Tehri Palace<br>Dargawa, II                                                                                                | 95<br>97<br>95                                  | SIRSA, XL<br>Kandarki, XXXVIII<br>Lati, XLII<br>Mili, XLIII<br>Akbarpur, XLIV        | 44<br>48<br>47<br>46                             | TINSMAL, VII†<br>Jagthar Hill Staff<br>Morari Hill Tree<br>Singan<br>Bhero<br>Budhon, III†<br>Jalampur<br>Sagoni<br>Kali<br>Patna, I<br>Lakhanjhar<br>Dhoban<br>Dargawa, II | 72<br>74<br>76<br>78<br>1<br>70<br>58<br>68<br>1<br>66<br>64<br>2 | SIRSA, XL<br>Kandarki, XXXVIII<br>Lati, XLII<br>Mili, XLIII<br>Akbarpur, XLIV                                                              | 95<br>97<br>95                                  |
| SARSOTHA, XXIX<br>Sankrao, XXVIII                                                                                                                           | 31                                              |                                                                                      |                                                  |                                                                                                                                                                             |                                                                   |                                                                                                                                            |                                                 |

\* Of the Great Arc Meridional Series—Section 24° to 30°. † Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

January 1879.

 J. B. N. HENNESSEY,  
In charge of Computing Office.

## BUDHON MERIDIONAL SERIES.

## CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— $\lambda$  stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically, H<sub>s</sub> for the Height when found by spirit leveling, and  $h$  for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of  $\lambda$  and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c., secondary stations by the letters h.s. and s. The names in small italics are those of the territories, states or districts in which the stations or points are situated. In a few instances the names of stations are spelt in two ways, those in italics are taken from a list of authorized spellings of names circulated by Government and received subsequently to the printing of the earlier pages of this volume.

| Name of station, district, description,<br>co-ordinates &c.                                                                 | Name of station, district, description,<br>co-ordinates &c.                                                                                                                          | Name of station, district, description,<br>co-ordinates &c.                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Agwānpur s.<br>(Moradabad) On house in fort. " "<br>$\lambda$ 28 55 48<br>L 78 45 56                                        | Amānpur Temple,<br>(Agra) Spire. " " "<br>$\lambda$ 26 53 44.5<br>L 78 37 12.2<br>No. 172                                                                                            | Aran Fort,<br>(Gwalior) Highest turret in village. "<br>$\lambda$ 25 57 6.4<br>L 77 58 38.1<br>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°. |
| Ahmoi h.s.<br>(Saugor) About $\frac{1}{2}$ mile N. of village so called.<br>$\lambda$ 24 20 35.11<br>L 78 37 1.80<br>No. 84 | Amarpur h.s.<br>(Gwalior) On a quartzose ridge running N.E. and S.W., which consists of two hills connected at their bases.<br>$\lambda$ 25 4 27.24<br>L 78 19 6.87<br>Nos. 120, 121 | Ater Temple,<br>(Gwalior) Highest point of spire.<br>$\lambda$ 26 43 45<br>L 78 42 9                                                                           |
| Akbarpur, XLIV.<br>(Vide page 9— <i>J.</i> )<br>$\lambda$ 29 4 56.85<br>L 78 40 50.96<br>H 719<br>$h$ 15<br>No. 46          | Amra Fort.<br>(Jhānsi)<br>$\lambda$ 25 41 14.14<br>L 78 56 55.25<br>No. 148                                                                                                          | Athgath, XIX.<br>(Vide page 6— <i>J.</i> )<br>$\lambda$ 26 47 59.51<br>L 78 45 4.33<br>H 577<br>$h$ 36<br>No. 21                                               |
| Algi, VIII.<br>(Vide page 4— <i>J.</i> )<br>$\lambda$ 25 29 46.20<br>L 78 23 58.16<br>H 1154<br>$h$ 0<br>No. 8              | Andhiāri (Andheri), IV.<br>(Vide page 4— <i>J.</i> )<br>$\lambda$ 24 41 6.77<br>L 78 16 16.17<br>H 1630<br>$h$ Not forthcoming<br>No. 4                                              | Atora, XXXIX.<br>(Vide page 8— <i>J.</i> )<br>$\lambda$ 28 42 41.94<br>L 78 39 43.31<br>H <sub>s</sub> 695.93*<br>$h$ 17.8<br>Nos. 41, 43                      |

\* Refers to the mark-stone let into the upper surface of the pillar.

| Name of station, district, description,<br>co-ordinates &c.                                                                                   | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                        | Name of station, district, description,<br>co-ordinates &c.                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Awa House Chimney.<br/>(Muttra) N. chimney of Rāja's house.</p> <p>λ 27 27 6<br/>L 78 31 47</p>                                            | <p>Barai Temple s.<br/>(Gwalior) Dome spire of hill temple.</p> <p>λ 26 6 13.69<br/>L 78 3 15.22</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p>                                                                                                                        | <p>Benaika Temple s.<br/>(Saugor)</p> <p>λ 24 6 34.27<br/>L 78 53 42.34<br/>No. 73</p>                                                            |
| <p>Bachondono Hill Temple.<br/>(Jhānsi)</p> <p>λ 25 37 45.1<br/>L 78 50 24.5<br/>Nos. 149, 150</p>                                            | <p>Barauli, XXXVII.<br/>(Vide page 8—J.)</p> <p>λ 28 32 2.39<br/>L 78 47 56.11<br/>H<sub>s</sub> 657*<br/>h 16<br/>No. 42</p>                                                                                                                                                                      | <p>Bhandauli s.<br/>(Gwalior) On the highest house in fort.</p> <p>λ 26 11 15.10<br/>L 78 19 32.54<br/>No. 170</p>                                |
| <p>Báh s.<br/>(Agra) On Patrol Officer's house.</p> <p>λ 26 52 29.77<br/>L 78 38 13.02<br/>No. 171</p>                                        | <p>Barh h.s.<br/>(Lalitpur) On the highest part of a ridge which is the most elevated of three ranges which run in a direction a little E. of N., about 100 feet S. of a conspicuous Math sacred to devi. It is marked on a platform.</p> <p>λ 24 52 30.27<br/>L 78 37 32.47<br/>Nos. 106, 107</p> | <p>Bharauni h.s.<br/>(Datia) About a mile S. of fort.</p> <p>λ 25 40 31.93<br/>L 78 24 38.40<br/>Nos. 158, 159</p>                                |
| <p>Bámor Peak,<br/>(Gwalior) Tree.</p> <p>λ 25 47 22<br/>L 78 4 59</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> | <p>Barodia h.s.<br/>(Saugor) On the eastern bastion of the hill fort.</p> <p>λ 24 12 16.74<br/>L 78 36 47.78<br/>Nos. 80, 81</p>                                                                                                                                                                   | <p>Bhatauli, XLII.<br/>(Vide page 9—J.)</p> <p>λ 28 54 0.60<br/>L 78 46 0.69<br/>H<sub>s</sub> 689.37§<br/>h 14.5<br/>No. 45</p>                  |
| <p>Banarsa h.s.<br/>(Tehri or Orchha) About a mile N. of Mohangarh fort.</p> <p>λ 25 0 11.04<br/>L 78 43 50.42<br/>Nos. 102, 103</p>          | <p>Barodia, N. Turret,<br/>(Saugor) Tiled.</p> <p>λ 24 12 53.6<br/>L 78 37 12.9</p> <p>See Synoptical Vol. of the Calcutta Longl. Series.</p>                                                                                                                                                      | <p>Bhero h.s.<br/>(Saugor) About ½ mile S. of Sagaria village.</p> <p>λ 24 4 37.58<br/>L 78 43 46.89<br/>Nos. 78, 79</p>                          |
| <p>Bánda Hill Staff.<br/>(Gwalior) About ½ mile E. of village so called.</p> <p>λ 26 9 47<br/>L 78 21 23</p>                                  | <p>Barwa Ságar High Tower.<br/>(Jhānsi)</p> <p>λ 25 22 40.1<br/>L 78 46 45.6<br/>No. 140</p>                                                                                                                                                                                                       | <p>Bhind, XVIII.<br/>(Vide page 6—J.)</p> <p>λ 26 33 32.92<br/>L 78 50 14.33<br/>H 562<br/>h 5¶<br/>No. 20</p>                                    |
| <p>Bánsopál, XXXV.<br/>(Vide page 8—J.)</p> <p>λ 28 33 28.07<br/>L 78 34 26.89<br/>H<sub>s</sub> 677†<br/>h 19<br/>No. 38</p>                 | <p>Batesar House.<br/>(Agra) Bania's house at E. end of the village.</p> <p>λ 26 56 9.2<br/>L 78 35 6.7<br/>No. 174</p>                                                                                                                                                                            | <p>Bhitári, VII.<br/>(Vide page 4—J.)</p> <p>λ 25 28 4.54<br/>L 78 46 39.51<br/>H 1055<br/>h 0<br/>No. 7</p>                                      |
| <p>Bara Dongra Hill Temple.<br/>(Lalitpur)</p> <p>λ 24 26 51.9<br/>L 78 31 50.4<br/>Nos. 93, 94</p>                                           | <p>Belgarh Hill Mark.<br/>(Gwalior) About a mile E. of Harsi village.</p> <p>λ 25 46 8<br/>L 77 59 30</p>                                                                                                                                                                                          | <p>Bijli h.s.<br/>(Lalitpur) On a detached hill, about 2 miles S.W. of Kelgong fort.</p> <p>λ 24 49 19.54<br/>L 78 46 31.60<br/>Nos. 108, 109</p> |
| <p>Baragaon, XXIII.<br/>(Vide page 6—J.)</p> <p>λ 27 15 2.94<br/>L 78 44 42.45<br/>H<sub>s</sub> 573.30†<br/>h 45.4<br/>No. 25</p>            | <p>Benaika Fort,<br/>(Saugor) Flag.</p> <p>λ 24 6 34.2<br/>L 78 53 40.5</p> <p>See Synoptical Vol. of the Calcutta Longl. Series.</p>                                                                                                                                                              |                                                                                                                                                   |

† Refers to the upper surface of the masonry pillar. ‡ Refers to the mark-stone imbedded at 1 foot below the ground floor of the tower. \* Refers to the upper surface of brick-work of the tower. § Refers to the upper mark-stone and was determined as follows:—the point leveled to was at the base of the tower of which the height = 673.88 feet and to this was added 15.49 feet (the height of upper mark-stone above that point obtained by subseque observations). ¶ Above roof of gateway on which the pillar stands.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Bijnor s.</b><br/>(<i>Bijnor</i>) On centre chimney of Collector's house.</p> <p>λ 29 22 41.52<br/>L 78 10 31.27<br/>No. 185</p> <p><b>Bila Hill Staff.</b><br/>(<i>Lalitpur</i>) On a detached hill, about 4 miles W. of Kua village and 1½ miles W. of a Nadi.</p> <p>λ 24 44 27.69<br/>L 78 41 3.89<br/>No. 110</p> <p><b>Birári h.s.</b><br/>(<i>Lalitpur</i>) On an isolated red stone hill lying between Barh and Ero and between Dhandkúa and Sirsod. The hill is rugged and of difficult ascent.</p> <p>λ 24 43 56.58<br/>L 78 32 41.51<br/>Nos. 116, 117</p> <p><b>Bitarwár Fort,</b><br/>(<i>Gwalior</i>) Central white dome.</p> <p>λ 25 47 20<br/>L 78 9 8<br/>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p><b>Budhon, III*.</b><br/>(<i>Vide page 3—J.</i>)</p> <p>λ 24 5 8.41<br/>L 78 33 39.07<br/>H 1867<br/>h 9<br/>No. 1</p> <p><b>Chandanpur, XXXVI.</b><br/>(<i>Vide page 8—J.</i>)</p> <p>λ 28 33 58.94<br/>L 78 20 59.24<br/>H 647<br/>h 16<br/>No. 39</p> <p><b>Chandeva h.s.</b><br/>(<i>Datia</i>) On a quartzose ridge running north and south, and derives its name from an ancient well, called Chandeva-ka-Báoli, situated about 50 yards east of the station. Marked by a circle and dot engraved on rock in the centre of a platform. The high road from Datia to Kálpí runs at the southern foot of the hill. The village of Bahádurpur lies at the N.E. extremity of the ridge and about ¼ mile from the station.</p> <p>λ 25 41 31.04<br/>L 78 34 32.96<br/>H 909<br/>h 0<br/>Nos. 144, 145</p> | <p><b>Chándipahár, LIV.</b><br/>(<i>Bijnor</i>) Hill station is situated on the highest part of the hill facing the town of Hardwár, a noted place of Hindu pilgrimage; in thána Nágál, tahsíl Najíbabad, district Bijnor. On a peak about half a mile north of the station stands a conspicuous Hindu temple. The river Ganges flows to the W. of the station, at a distance of about a mile. Marked by a solid platform having mark-stones at top and bottom.</p> <p>λ 29 55 29.73<br/>L 78 13 37.13<br/>H 1913<br/>h 6<br/>No. 79<br/>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p><b>Chándipahár Hill Temple,</b><br/>(<i>Bijnor</i>) Spire.</p> <p>λ 29 56 1<br/>L 78 13 20</p> <p><b>Chinúr Hill Fort,</b><br/>(<i>Gwalior</i>) White circular turret W. end.</p> <p>λ 25 56 42.4<br/>L 78 8 31.8<br/>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p><b>Dádo House.</b><br/>(<i>Aligarh</i>) Chimney of zamíndár's house.</p> <p>λ 27 57 8.3<br/>L 78 30 27.6<br/>No. 179</p> <p><b>Dargawa, II.</b><br/>(<i>Vide page 4—J.</i>)</p> <p>λ 24 37 13.21<br/>L 79 3 51.81<br/>H 1452<br/>h 0<br/>No. 2</p> <p><b>Daryapur, IX.</b><br/>(<i>Vide page 5—J.</i>)</p> <p>λ 25 42 12.41<br/>L 78 40 55.86<br/>H 793<br/>h Not forthcoming<br/>No. 9</p> <p><b>Datia Palace.</b><br/>(<i>Datia</i>) Steeple of a large and conspicuous building called Rájgarh which consists of four or five stories surmounted by a dome.</p> <p>λ 25 40 14.5<br/>L 78 29 35.5<br/>Nos. 156, 157</p> | <p><b>Debrai Fort s.</b><br/>(<i>Etah</i>) On the S.W. tower of old fort.</p> <p>λ 27 50 37.35<br/>L 78 44 58.29<br/>No. 183</p> <p><b>Deogarh Hill Fort.</b><br/>(<i>Gwalior</i>) On a flat-topped hill of sandstone detached from the main range and consisting of a wall flanked by tower bastions around the outer edge of the hill.</p> <p>λ 26 5 1<br/>L 78 37 8<br/>No. 169</p> <p><b>Dhandkúa, III.</b><br/>(<i>Vide page 4—J.</i>)</p> <p>λ 24 47 35.33<br/>L 78 45 44.02<br/>H 1291<br/>h Not forthcoming<br/>No. 3</p> <p><b>Dhoban h.s.</b><br/>(<i>Saugor</i>) About a mile N.W. of Dulchipur fort.</p> <p>λ 24 15 40.54<br/>L 79 2 24.54<br/>Nos. 64, 65</p> <p><b>Dholpahári h.s.</b><br/>(<i>Saugor</i>) About 1½ miles E. of Túrú village.</p> <p>λ 23 58 41.28<br/>L 78 57 42.04<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p><b>Dongra Hill Temple.</b><br/>(<i>Lalitpur</i>)</p> <p>λ 24 22 29.5<br/>L 78 39 46.8<br/>Nos. 85, 86</p> <p><b>Dugáo Fort,</b><br/>(<i>Saugor</i>) N.W. angle of a high square building.</p> <p>λ 24 9 39.6<br/>L 78 27 56.3<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p><b>Ero h.s.</b><br/>(<i>Lalitpur</i>) On a flat-topped hill near village of the same name. The hill is rugged and of difficult ascent.</p> <p>λ 24 33 26.36<br/>L 78 23 1.77<br/>No. 99</p> <p><b>Ferozpur (<i>Firozpur</i>) s.</b><br/>(<i>Muzaffarnagar</i>) On the roof of a building about 25 feet high in village so called, ¼ mile S. of the Ganges, and 2 miles N.E. of Bhúkarheri town.</p> <p>λ 29 30 6.27<br/>L 78 1 0.80<br/>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Firozabad, XXII.<br/>(<i>Vide page 6—J.</i>)</p> <p>λ 27 8 37.46<br/>L 78 25 56.23<br/>H<sub>s</sub> 557.44*<br/>h 43.8†<br/>No. 24</p> <p>Genrol Hill Staff.<br/>(<i>Gwalior</i>) On hill at the W. foot of which is the village so called.</p> <p>λ 25 53 15.77<br/>L 78 24 43.57<br/>Nos. 167, 168</p> <p>Gharabo h.s.<br/>(<i>Datia</i>) Close to village so called and about 1½ miles S. of Sersa village.</p> <p>λ 25 35 53.17<br/>L 78 34 29.67<br/>Nos. 146, 147</p> <p>Ghatoli Hill Staff.<br/>(<i>Gwalior</i>) About a mile from the villages of Gatbara and Lidhaura which are situated respectively on the E. and W. sides of the hill.</p> <p>λ 25 14 58.60<br/>L 78 18 11.15<br/>No. 189</p> <p>Godhna, XLIX.<br/>(<i>Muzaffarnagar</i>) Tower Station is built on the high bank which bounds the bed of the Ganges to the west, and is distant about ¼ of a mile to the east of the village from which its name is derived; in pargana Pār Chhapār, tahsil Muzaffarnagar. The village of Kāzīkūpur is about 4 miles to W. and that of Thugalpur 1½ miles to S. Marked by a hollow tower having a mark-stone in the ground floor.</p> <p>λ 29 37 18.46<br/>L 77 56 30.16<br/>H 90.1<br/>h 5.1<br/>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Gorar h.s.<br/>(<i>Saugor</i>) On the northern extremity of a detached hill, about a mile W. of Derli village.</p> <p>λ 24 17 15.24<br/>L 78 38 3.15<br/>No. 90</p> <p>Gujāra Hill Fort.<br/>(<i>Gwalior</i>)</p> <p>λ 26 4 54<br/>L 78 30 43<br/>Nos. 163, 164</p> | <p>Gurar h.s.<br/>(<i>Gwalior</i>) On the high peak which overlooks the village so called. Marked by a platform erected in rear of a sandstone building in which are placed the figures of Hindu gods and goddesses.</p> <p>λ 24 58 14.51<br/>L 78 8 23.74<br/>Nos. 122, 123</p> <p>Gúrmi, XVII.<br/>(<i>Vide page 5—J.</i>)</p> <p>λ 26 36 3.63<br/>L 78 33 17.00<br/>H 57.5<br/>h 27†<br/>No. 19</p> <p>Gwāli, V.<br/>(<i>Vide page 4—J.</i>)</p> <p>λ 25 10 25.82<br/>L 78 28 5.22<br/>H 120.9<br/>h Not forthcoming<br/>No. 5</p> <p>Gwalior Hill Temple,<br/>(<i>Gwalior</i>) At southern end of fort.</p> <p>λ 26 13 12.3<br/>L 78 12 28.2<br/>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Haldaur, XLVI.<br/>(<i>Vide page 9—J.</i>)</p> <p>λ 29 16 41.23<br/>L 78 18 33.28<br/>H 80.6<br/>h 20<br/>No. 51</p> <p>Harpālsid, XLVIII.<br/>(<i>Vide page 9—J.</i>)</p> <p>λ 29 39 50.90<br/>L 78 35 47.99<br/>H 287.6<br/>h 0<br/>Nos. 52, 54</p> <p>Hill θ.<br/>(<i>Dehra Dūn</i>) On the Siwālik hills, about ½ mile W. of Kharkhari village.</p> <p>λ 29 57 58.1<br/>L 78 12 26.9<br/>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> | <p>Himmatgarh Hill Fort Building.<br/>(<i>Gwalior</i>) S. Staircase of a square building.</p> <p>λ 26 3 5.3<br/>L 78 5 24.9<br/>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Himmatgarh Hill Fort Gate.<br/>(<i>Gwalior</i>) Cupola over eastern gate.</p> <p>λ 26 3 3.2<br/>L 78 5 25.4<br/>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Himmatgarh Peak,<br/>(<i>Gwalior</i>) Pointed Stone, W. of fort.</p> <p>λ 26 2 32.2<br/>L 78 4 30.0<br/>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Jagthar Hill Staff.<br/>(<i>Saugor</i>) About 2 miles W. of Puthari village.</p> <p>λ 24 4 38.31<br/>L 78 58 45.28<br/>No. 72</p> <p>Jajādeo Hill Temple,<br/>(<i>Gwalior</i>) Square.</p> <p>λ 25 43 17.3<br/>L 77 57 15.2<br/>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> <p>Jālampur h.s.<br/>(<i>Saugor</i>) About a mile N. of Ratanpur village.</p> <p>λ 24 7 7.20<br/>L 78 57 27.66<br/>Nos. 70, 71</p> <p>Jalesar s.<br/>(<i>Muttra</i>) On S.W. corner of Tahsilddār's Kachahri.</p> <p>λ 27 28 16<br/>L 78 20 52</p> <p>Jalesar Temple.<br/>(<i>Muttra</i>) Old temple E. of Jalesar.</p> <p>λ 27 28 9<br/>L 78 21 32</p> <p>Jamālpur, XXVII.<br/>(<i>Vide page 7—J.</i>)</p> <p>λ 27 48 10.77<br/>L 78 51 35.08<br/>H 59.9<br/>h 28<br/>No. 29</p> |

\* Refers to the mark-stone imbedded at 1 foot below the level of the terreplein of the rampart on which the tower is built. † Above the terreplein of the rampart on which the tower stands.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                            | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                               | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Jawālapur House s.</b><br><i>(Sahāranpur)</i> On Bania's high paka house, marked with an iron spike.<br>$\lambda$ 29 55 26.87<br>$L$ 78 9 1.09<br>Nos. 189                                                                                                                                          | <b>Kālapahār h.s.</b><br><i>(Lalitpur)</i> On one of a group of detached hills of moderate elevation covered with dense jungle and of not very steep ascent.<br>$\lambda$ 24 44 59.30<br>$L$ 78 19 10.86<br>Nos. 118, 119 | <b>Kasar Fort s.</b><br><i>(Aligarh)</i> On N.E. tower of old fort.<br>$\lambda$ 27 55 11<br>$L$ 78 33 47                                                                                         |
| <b>Jawālapur s.</b><br><i>(Sahāranpur)</i><br>$\lambda$ 29 55 8.60<br>$L$ 78 9 53.40<br>$H$ 932<br>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.                                                                                                                                     | <b>Kāli h.s.</b><br><i>(Saugor)</i> About 2 miles S. of Dhamoni fort.<br>$\lambda$ 24 10 28.15<br>$L$ 78 47 52.96<br>Nos. 68, 69                                                                                          | <b>Kathera, VI.</b><br><i>(Vide page 4—J.)</i><br>$\lambda$ 25 14 20.91<br>$L$ 78 59 39.05<br>$H$ 1349<br>$h$ Not forthcoming<br>No. 6                                                            |
| <b>Jerila Temple.</b><br><i>(Agra)</i> Spire of high temple.<br>$\lambda$ 27 19 32<br>$L$ 78 30 12                                                                                                                                                                                                     | <b>Kamad Fort s.</b><br><i>(Datia)</i> On S.W. bastion of fort.<br>$\lambda$ 25 37 41.49<br>$L$ 78 40 14.24<br>Nos. 154, 155                                                                                              | <b>Kilārmāo, XXV.</b><br><i>(Vide page 7—J.)</i><br>$\lambda$ 27 33 11.44<br>$L$ 78 48 58.27<br>$H$ 605<br>$h$ 44<br>No. 27                                                                       |
| <b>Jhakaura h.s.</b><br><i>(Lalitpur)</i> On a hill of quartzose structure, running E. and W., about $\frac{1}{2}$ mile N.W. of village so called. This hill, though of moderate elevation, has a good command of the surrounding country.<br>$\lambda$ 24 55 4.28<br>$L$ 78 22 15.18<br>Nos. 124, 125 | <b>Kandarki, XXXVIII.</b><br><i>(Vide page 8—J.)</i><br>$\lambda$ 28 43 37.17<br>$L$ 78 27 2.57<br>$H$ 689<br>$h$ 19<br>No. 40                                                                                            | <b>Kimlāsa Pagoda.</b><br><i>(Saugor)</i><br>$\lambda$ 24 12 21.2<br>$L$ 78 24 24.9<br>See Synoptical Vol. of the Calcutta Longitudinal Series.                                                   |
| <b>Jhānkri, XVI.</b><br><i>(Vide page 5—J.)</i><br>$\lambda$ 26 18 53.92<br>$L$ 78 34 41.30<br>$H$ 624<br>$h$ Not forthcoming<br>No. 16                                                                                                                                                                | <b>Kankhal Solitary Temple,</b><br><i>(Sahāranpur)</i> Spire, in the bed of the Ganges river, S. of town.<br>$\lambda$ 29 54 59.2<br>$L$ 78 11 22.2<br>No. 187                                                            | <b>Korār Hill Fort,</b><br><i>(Tehri or Orchha)</i> Southern highest building.<br>$\lambda$ 25 28 50.9<br>$L$ 78 56 26.6<br>Nos. 141, 142                                                         |
| <b>Jhānsi Fort,</b><br><i>(Gwalior)</i> Flag.<br>$\lambda$ 25 27 27.6<br>$L$ 78 37 4.8<br>Nos. 185, 186                                                                                                                                                                                                | <b>Kankhal Temple,</b><br><i>(Sahāranpur)</i> Northernmost, on bank of the Ganges river near Bhāramal's garden.<br>$\lambda$ 29 55 50.3<br>$L$ 78 11 38.0<br>No. 188                                                      | <b>Kotla s.</b><br><i>(Agra)</i> On gateway of Raja's palace.<br>$\lambda$ 27 16 25.63<br>$L$ 78 30 9.45<br>No. 175                                                                               |
| <b>Jīār Hill Staff.</b><br><i>(Jhānsi)</i> On a detached hill on E. side of which lies the village so called.<br>$\lambda$ 25 14 20.23<br>$L$ 78 47 22.49<br>Nos. 126, 127                                                                                                                             | <b>Karaia, XII.</b><br><i>(Vide page 5—J.)</i><br>$\lambda$ 25 53 47.07<br>$L$ 78 2 43.76<br>$H$ 1287<br>$h$ Not forthcoming<br>No. 14                                                                                    | <b>Labhauwa Palace.</b><br><i>(Mainpuri)</i> Small turret on the S.E. angle of the building.<br>$\lambda$ 27 9 12.2<br>$L$ 78 36 6.1<br>No. 176                                                   |
| <b>Kādirbāri s.</b><br><i>(Etah)</i> On a platform, with centre-mark, on a high mound W. of the village.<br>$\lambda$ 27 55 43.38<br>$L$ 78 47 12.17<br>No. 181                                                                                                                                        | <b>Kariāmāi, XXXII.</b><br><i>(Vide page 7—J.)</i><br>$\lambda$ 28 15 7.44<br>$L$ 78 48 1.99<br>$H$ 624<br>$h$ 17<br>No. 33                                                                                               | <b>Lachmangarh Hill Fort.</b><br><i>(Gwalior)</i> Staircase of southernmost building.<br>$\lambda$ 25 47 40.7<br>$L$ 78 9 23.6<br>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°. |



| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                  | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                  | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Ladára h.s.</b><br/>(<i>Gwalior</i>) On N.E. extremity of sandstone hills 2 miles S.E. of Narwar town; denoted by a circular platform which has the usual mark-stone on its surface.</p> <p>λ 25 37 22·25<br/>L 77 57 56·67</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> | <p><b>Mahrora s.</b><br/>(<i>Lalitpur</i>) On Kamal bastion of Márogarh fort in town.</p> <p>λ 24 22 47·15<br/>L 78 50 43·31<br/>Nos. 82, 83</p>                                             | <p><b>Milik, XLIII.</b><br/>(<i>Vide page 9—J.</i>)</p> <p>λ 29 4 42·70<br/>L 78 27 55·61<br/>H 742<br/>h 17<br/>Nos. 47, 49</p>                                                                               |
| <p><b>Ladára Hill Tomb,</b><br/>(<i>Gwalior</i>) Eastern.</p> <p>λ 25 37 48·7<br/>L 77 57 23·9</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p>                                                                                                                                    | <p><b>Majhár, XIV.</b><br/>(<i>Vide page 5—J.</i>)</p> <p>λ 26 6 17·00<br/>L 78 30 44·91<br/>H 1028<br/>h Not forthcoming<br/>No. 11</p>                                                     | <p><b>Mohangarh Fort.</b><br/>(<i>Tehri or Orchha</i>) Highest point in fort which consists of a paka wall with bastions running along the ridge.</p> <p>λ 24 59 42·88<br/>L 78 43 21·04<br/>Nos. 113, 114</p> |
| <p><b>Lahar Hill Staff.</b><br/>(<i>Gwalior</i>) On a detached hill about a mile N. of village so called.</p> <p>λ 25 28 0·94<br/>L 78 35 25·21<br/>Nos. 137, 138</p>                                                                                                                                        | <p><b>Majhgawán Hill Staff.</b><br/>(<i>Tehri or Orchha</i>) Near Kandi village and about ½ a mile from the right bank of Jamni river.</p> <p>λ 24 50 7·22<br/>L 78 50 15·44<br/>No. 115</p> | <p><b>Mora h.s.</b><br/>(<i>Tehri or Orchha</i>) About a mile W. of Mora village.</p> <p>λ 25 6 37·18<br/>L 78 51 13·89<br/>Nos. 104, 105</p>                                                                  |
| <p><b>Lakhanjhír h.s.</b><br/>(<i>Lalitpur</i>) About 1½ miles E. of Papro village.</p> <p>λ 24 14 35·34<br/>L 78 53 51·38<br/>Nos. 66, 67</p>                                                                                                                                                               | <p><b>Maltaun h.s.</b><br/>(<i>Saugor</i>) On a detached hill about a mile S.E. of fort so called.</p> <p>λ 24 18 9·42<br/>L 78 35 23·94<br/>Nos. 91, 92</p>                                 | <p><b>Moradabad s.</b><br/>(<i>Moradabad</i>) On Collector's Kaedahri.</p> <p>λ 28 51 6<br/>L 78 48 35</p>                                                                                                     |
| <p><b>Lút, XLI.</b><br/>(<i>Vide page 9—J.</i>)</p> <p>λ 28 53 42·23<br/>L 78 20 57·91<br/>H 716<br/>h 20<br/>No. 48</p>                                                                                                                                                                                     | <p><b>Mamaun h.s.</b><br/>(<i>Tehri or Orchha</i>) About 1½ miles E. of the town of Tehri.</p> <p>λ 24 44 45·44<br/>L 78 54 45·72<br/>No. 96</p>                                             | <p><b>Morári Hill Tree.</b><br/>(<i>Saugor</i>) Large tamarind tree.</p> <p>λ 24 6 16<br/>L 79 0 3<br/>Nos. 74, 75</p>                                                                                         |
| <p><b>Mábegarh, I.*</b><br/>(<i>Vide page 9—J.</i>)</p> <p>λ 29 52 39·58<br/>L 78 29 52·03<br/>H 5652<br/>h 7<br/>No. 57</p>                                                                                                                                                                                 | <p><b>Mandri h.s.</b><br/>(<i>Saugor</i>) About 2 miles W. of Palaitna village.</p> <p>λ 24 15 38·30<br/>L 78 35 16·09<br/>Nos. 88, 89</p>                                                   | <p><b>Náh House Chimney,</b><br/>(<i>Aligarh</i>) Of Zamíndár's house.</p> <p>λ 27 58 35<br/>L 78 34 19</p>                                                                                                    |
| <p><b>Maharájpur, X.</b><br/>(<i>Vide page 5—J.</i>)</p> <p>λ 25 53 54·44<br/>L 78 16 40·27<br/>H 1015<br/>h Not forthcoming<br/>No. 10</p>                                                                                                                                                                  | <p><b>Mangára Building,</b><br/>(<i>Gwalior</i>) S.W. corner.</p> <p>λ 26 5 25·5<br/>L 78 5 38·2</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p>                  | <p><b>Nandauli House.</b><br/>(<i>Etah</i>) Staircase of Bania's house.</p> <p>λ 27 34 27·1<br/>L 78 32 4·3<br/>No. 178</p>                                                                                    |
| <p><b>Mahesari, LII.†</b><br/>(<i>Vide page 10—J.</i>)</p> <p>λ 29 30 18·21<br/>L 78 11 18·88<br/>H 821<br/>h 14<br/>No. 55</p>                                                                                                                                                                              | <p><b>Mehtra, XXXIV..</b><br/>(<i>Vide page 8—J.</i>)</p> <p>λ 28 22 5·99<br/>L 78 41 23·88<br/>H 652½<br/>h 16<br/>No. 34</p>                                                               | <p><b>Nandi, XLVII.</b><br/>(<i>Vide page 9—J.</i>)</p> <p>λ 29 17 7·53<br/>L 78 48 59·41<br/>H 771<br/>h 12<br/>No. 53</p>                                                                                    |
|                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                              | <p><b>Nandrée Temple.</b><br/>(<i>Etah</i>) Spire of large temple.</p> <p>λ 27 46 53<br/>L 78 39 37</p>                                                                                                        |

\* Of the North-East Longitudinal Series.

† Of the Great Arc Series—Section 24° to 30°.

‡ Refers to the upper surface of brick-work of the tower.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                            | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                        | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Narki s.<br/>(Agra) On small pillar on Raja's house.</p> <p>λ 27 17 42<br/>L 78 26 47</p>                                                                           | <p>Paniári Building.<br/>(Gwalior) Cupola of a square building surmounted by a dome.</p> <p>λ 26 6 13.8<br/>L 78 4 31.1</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> | <p>Ráipur (Raepur) Building,<br/>(Gwalior) Northernmost, in village.</p> <p>λ 25 44 12<br/>L 77 34 35</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p>                                                                                                                                         |
| <p>Narwar, XI.<br/>(Vide page 5—J.)</p> <p>λ 25 37 22.30<br/>L 77 57 56.47<br/>H 1489<br/>h Not forthcoming</p> <p>No. 13</p>                                          | <p>Paniári Village Building,<br/>(Gwalior) S. gate.</p> <p>λ 26 5 55<br/>L 78 4 18</p>                                                                                                             | <p>Ráipur (Raepur) Peak Temple.<br/>(Gwalior) Dome of square temple.</p> <p>λ 26 8 16.4<br/>L 78 7 16.8</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p>                                                                                                                                       |
| <p>Narwar Fort,<br/>(Gwalior) N. gateway of inner fort.</p> <p>λ 25 39 2.9<br/>L 77 56 56.5</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p> | <p>Parauli, XXXI.<br/>(Vide page 7—J.)</p> <p>λ 28 9 45.27<br/>L 78 23 31.39<br/>H 643<br/>h 19</p> <p>No. 36</p>                                                                                  | <p>Ráipur (Raepur) Temple.<br/>(Gwalior) In village.</p> <p>λ 26 7 51.2<br/>L 78 5 51.8</p> <p>See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</p>                                                                                                                                                       |
| <p>Orchha Temple.<br/>(Tehri or Orchha)</p> <p>λ 25 20 59.0<br/>L 78 40 54.7</p> <p>No. 143</p>                                                                        | <p>Pátan Temple.<br/>(Saugor)</p> <p>λ 24 7 27.7<br/>L 78 54 47.0</p> <p>See Synoptical Vol. of the Calcutta Longitudinal Series.</p>                                                              | <p>Rajauli, XXXIII.<br/>(Vide page 8—J.)</p> <p>λ 28 22 27.53<br/>L 78 27 39.95<br/>H 629<br/>h 23</p> <p>Nos. 35, 37</p>                                                                                                                                                                                                |
| <p>Pabha h.s.<br/>(Lalitpur) On a quartzose ridge running N.E. and S.W.</p> <p>λ 25 5 48.06<br/>L 78 30 41.87</p> <p>Nos. 100, 101</p>                                 | <p>Patna, I.<br/>(Vide page 4—J.)</p> <p>λ 24 20 3.70<br/>L 78 39 36.15<br/>H 1823<br/>h Not forthcoming</p> <p>No. 1</p>                                                                          | <p>Rámgarh Hill Staff.<br/>(Datia) On a quartz high ridge near the village so called.</p> <p>λ 25 53 6.59<br/>L 78 32 10.49</p> <p>Nos. 165, 166</p>                                                                                                                                                                     |
| <p>Painári Temple,<br/>(Saugor) On hill.</p> <p>λ 24 1 20.4<br/>L 78 54 58.2</p> <p>See Synoptical Vol. of the Calcutta Longitudinal Series.</p>                       | <p>Pindarua Fort,<br/>(Saugor) Flag.</p> <p>λ 24 6 22.8<br/>L 78 44 52.5</p> <p>See Synoptical Vol. of the Calcutta Longitudinal Series.</p>                                                       | <p>Rámghat House.<br/>(Bulandshahr) Bania's house at W. end of village.</p> <p>λ 28 5 42.2<br/>L 78 25 45.4</p> <p>No. 184</p>                                                                                                                                                                                           |
| <p>Panáhat, XX.<br/>(Vide page 6—J.)</p> <p>λ 26 52 39.07<br/>L 78 24 58.83<br/>H 588<br/>h 30</p> <p>No. 22</p>                                                       | <p>Pondri, XXIV.<br/>(Vide page 6—J.)</p> <p>λ 27 27 52.48<br/>L 78 26 52.19<br/>H 594.75*<br/>h 44.3</p> <p>No. 26</p>                                                                            | <p>Rámpura Hill Staff.<br/>(Saugor) Near Rampur village.</p> <p>λ 24 13 35.97<br/>L 78 47 42.45</p> <p>No. 87</p>                                                                                                                                                                                                        |
| <p>Pandúa h.s.<br/>(Lalitpur) Also called Sakáto h.s. About 1½ miles N. of Petoria village.</p> <p>λ 24 16 44.45<br/>L 78 42 33.75</p> <p>Nos. 62, 63</p>              | <p>Ráepur (Raepur), XIII.<br/>(Vide page 5—J.)</p> <p>λ 26 8 14.29<br/>L 78 7 16.15<br/>H 1219<br/>h Not forthcoming</p> <p>Nos. 12, 15</p>                                                        | <p>Rán h.s.<br/>(Gwalior) On a high ridge of the dark quartzose formation, about two miles from the village and fort of Belhári. It is the highest hill in that direction. Close to the Ráon hill to the W. runs the Non river, a tributary of the Sindh.</p> <p>λ 25 41 48.89<br/>L 78 18 6.76</p> <p>Nos. 161, 162</p> |

\* Refers to the mark-stone imbedded at 1 foot below the ground floor of the tower.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ratangawán h.s.</b><br><i>(Tehri or Orchha)</i> About a mile W. of village so called.<br><div style="text-align: center;">o ' "</div> <div style="display: flex; justify-content: space-between;"> <span>λ</span><span>25 1 38.71</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 50 44.07</span></div> <div style="text-align: center;">Nos. 111, 112</div>                                                                                                          | <b>Sánichri (<i>Saníchari</i>), XV.</b><br><i>(Vide page 5—J.)</i><br><div style="text-align: center;">o ' "</div> <div style="display: flex; justify-content: space-between;"> <span>λ</span><span>26 23 31.20</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 15 30.00</span></div> <div style="display: flex; justify-content: space-between;"> <span>H</span><span>825</span></div> <div style="display: flex; justify-content: space-between;"> <span>h</span><span>Not forthcoming</span></div> <div style="text-align: center;">Nos. 17, 18</div> | <b>Shikohabad s.</b><br><i>(Mainpuri)</i> On staircase of gateway on the Agra road, S. end of town.<br><div style="text-align: center;">o ' "</div> <div style="display: flex; justify-content: space-between;"> <span>λ</span><span>27 6 9.32</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 38 6.93</span></div> <div style="text-align: center;">No. 173</div>                                                                                                        |
| <b>Ronda Fort,</b><br><i>(Saugor)</i> S.W. angle.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>24 10 36.3</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 32 39.7</span></div> <div style="text-align: center;">See Synoptical Volume of the Calcutta Longl. Series.</div>                                                                                                                                                        | <b>Sankráo, XXVIII.</b><br><i>(Vide page 7—J.)</i><br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>28 2 28.99</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 34 30.15</span></div> <div style="display: flex; justify-content: space-between;"> <span>H</span><span>670</span></div> <div style="display: flex; justify-content: space-between;"> <span>h</span><span>37</span></div> <div style="text-align: center;">No. 30</div>                                                                                 | <b>Singan h.s.</b><br><i>(Saugor)</i> About 2 miles E. of Pitauli village.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>24 1 33.53</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 47 0.90</span></div> <div style="text-align: center;">Nos. 76, 77</div>                                                                                                                                                                         |
| <b>Sagoni h.s.</b><br><i>(Saugor)</i> About 1½ miles E. of Tágar village.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>24 7 42.60</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 42 58.34</span></div> <div style="text-align: center;">Nos. 58, 59</div>                                                                                                                                                                        | <b>Sanyer Hill Staff.</b><br><i>(Jhānsi)</i> About 5 miles W. of the town of Orchha.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>25 21 12.80</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 36 30.21</span></div> <div style="text-align: center;">Nos. 133, 134</div>                                                                                                                                                                                                                                          | <b>Sirsa, XL.</b><br><i>(Vide page 8—J.)</i><br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>28 54 39.64</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 34 33.32</span></div> <div style="display: flex; justify-content: space-between;"> <span>H</span><span>739.45†</span></div> <div style="display: flex; justify-content: space-between;"> <span>h</span><span>26.0</span></div> <div style="text-align: center;">No. 44</div> |
| <b>Sahaswán Platform.</b><br><i>(Budaun)</i> On a high mound N. of village.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>28 4 25.7</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 47 16.0</span></div> <div style="text-align: center;">No. 180</div>                                                                                                                                                                            | <b>Sarkára, XLV.</b><br><i>(Vide page 9—J.)</i><br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>29 15 46.92</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 34 47.36</span></div> <div style="display: flex; justify-content: space-between;"> <span>H</span><span>761</span></div> <div style="display: flex; justify-content: space-between;"> <span>h</span><span>16</span></div> <div style="text-align: center;">No. 50</div>                                                                                   | <b>Sonania h.s.</b><br><i>(Tehri or Orchha)</i> On a detached hill near village so called.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>25 20 2.19</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 44 56.30</span></div> <div style="text-align: center;">Nos. 131, 132</div>                                                                                                                                                      |
| <b>Sakít Temple.</b><br><i>(Etah)</i> Spire of highest temple.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>27 26 10.4</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 49 14.9</span></div> <div style="text-align: center;">No. 177</div>                                                                                                                                                                                        | <b>Sarkaura h.s.</b><br><i>(Lalitpur)</i> On a detached hill near village so called.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>24 34 13.34</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 56 43.22</span></div> <div style="text-align: center;">No. 95</div>                                                                                                                                                                                                                                                 | <b>Sonáwal Temple.</b><br><i>(Datia)</i> On a sandstone hill so called.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>25 43 3.9</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 24 54.8</span></div> <div style="text-align: center;">No. 160</div>                                                                                                                                                                                 |
| <b>Sakrora, XXX.</b><br><i>(Vide page 7—J.)</i><br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>28 13 12.59</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 35 43.17</span></div> <div style="display: flex; justify-content: space-between;"> <span>H</span><span>613</span></div> <div style="display: flex; justify-content: space-between;"> <span>h</span><span>21</span></div> <div style="text-align: center;">No. 32</div>   | <b>Sarsotha, XXIX.</b><br><i>(Vide page 7—J.)</i><br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>28 5 59.88</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 47 40.39</span></div> <div style="display: flex; justify-content: space-between;"> <span>H</span><span>606</span></div> <div style="display: flex; justify-content: space-between;"> <span>h</span><span>24</span></div> <div style="text-align: center;">No. 31</div>                                                                                  | <b>Soron House.</b><br><i>(Etah)</i> Bania's high house.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>27 53 34.0</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 47 19.6</span></div> <div style="text-align: center;">No. 182</div>                                                                                                                                                                                               |
| <b>Salámpur, XXVI.</b><br><i>(Vide page 7—J.)</i><br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>27 46 36.46</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 33 15.88</span></div> <div style="display: flex; justify-content: space-between;"> <span>H</span><span>645</span></div> <div style="display: flex; justify-content: space-between;"> <span>h</span><span>48</span></div> <div style="text-align: center;">No. 28</div> | <b>Sheopuri, XLVIII*.</b><br><i>(Vide page 10—J.)</i><br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>29 18 59.08</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 1 58.60</span></div> <div style="display: flex; justify-content: space-between;"> <span>H</span><span>871</span></div> <div style="display: flex; justify-content: space-between;"> <span>h</span><span>41</span></div> <div style="text-align: center;">No. 56</div>                                                                              | <b>Súrajpahár h.s.</b><br><i>(Dehra Dún)</i> On the highest point of the hill.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>29 57 58.35</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 12 26.76</span></div> <div style="text-align: center;">No. 186</div>                                                                                                                                                                       |
| <b>Salun Hill Temple.</b><br><i>(Jhānsi)</i><br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>25 41 17.8</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 49 36.0</span></div> <div style="text-align: center;">Nos. 151, 152</div>                                                                                                                                                                                                    | <b>Sherpur, XXI.</b><br><i>(Vide page 6—J.)</i><br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>27 0 41.38</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 41 33.12</span></div> <div style="display: flex; justify-content: space-between;"> <span>H</span><span>578</span></div> <div style="display: flex; justify-content: space-between;"> <span>h</span><span>31†</span></div> <div style="text-align: center;">No. 23</div>                                                                                   | <b>Súrajpur Building,</b><br><i>(Gwalior)</i> Square, E. end of S. wall.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>25 58 19.6</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 4 25.4</span></div> <div style="text-align: center;">See Synoptical Vol. of the Great Arc Series—Section 24° to 30°.</div>                                                                                                                        |
| <b>Samaspur h.s.</b><br><i>(Saugor)</i> Near Sanjra village.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>24 11 14.54</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 42 17.02</span></div> <div style="text-align: center;">Nos. 60, 61</div>                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Suru Hill Staff.</b><br><i>(Datia)</i> About 1½ miles N.W. of the town of Datia.<br><div style="display: flex; justify-content: space-between;"> <span>λ</span><span>25 41 17.62</span></div> <div style="display: flex; justify-content: space-between;"> <span>L</span><span>78 28 27.71</span></div> <div style="text-align: center;">No. 153</div>                                                                                                                                                                  |

\* Of the Great Arc Series—Section 24° to 30°. † Above the terreplein of the rampart on which the tower stands. ‡ Refers to the upper mark-stone of the tower and was determined as follows. The point leveled to was at the base of the tower of which the height = 715.22 feet and to this was added 24.23 feet (the height of upper mark-stone above that point obtained by subtense observations).

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                         | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                            | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Talapahári h.s.<br/>(<i>Gwalior</i>) On the highest of the group of Talapahár hills which is of moderate elevation and of sandstone structure. The station lies about <math>\frac{1}{2}</math> a mile off from the village of that name. The Betwanti flows through these hills.</p> <p style="text-align: center;">° ' "</p> <p> <math>\lambda</math>            24 58 49.05<br/> <math>L</math>            78 20 18.21<br/> Nos. 128, 129 </p> | <p>Tehri Palace.<br/>(<i>Tehri or Orohha</i>) Flagstaff on palace in fort.</p> <p style="text-align: center;">° ' "</p> <p> <math>\lambda</math>            24 44 32.8<br/> <math>L</math>            78 52 37.7<br/> Nos. 97, 98 </p> | <p>Tinsmál, VII*.<br/>(<i>Vide page 4—J.</i>)</p> <p style="text-align: center;">° ' "</p> <p> <math>\lambda</math>            24 7 12.97<br/> <math>L</math>            79 2 12.45<br/> <math>H</math>            2139<br/> <math>h</math>            9<br/> No. 1 </p> |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

*February* 1879.

J. B. N. HENNESSEY,  
*In charge of Computing Office.*

*List of Published Works of the Great Trigonometrical Survey of India.*

---

An Account of the Measurement of an Arc of the meridian between the parallels of  $18^{\circ} 3'$  and  $24^{\circ} 7'$ , being a continuation of the Grand Meridional Arc of India as detailed by the late Lieutenant-Colonel Lambton in the Volumes of the Asiatic Society of Calcutta. By Captain George Everest, of the Bengal Artillery, F.R.S., &c. London, 1830.

An Account of the Measurement of two Sections of the Meridional Arc of India, bounded by the parallels of  $18^{\circ} 3' 5''$ ;  $24^{\circ} 7' 11''$ ; and  $29^{\circ} 30' 18''$ . By Lieutenant-Colonel Everest, F.R.S., &c., late Surveyor General of India, and his Assistants. London, 1847.

---

Account of the Operations of the Great Trigonometrical Survey of India.

- Volume I. The Standards of Measure and the Base-Lines, also an Introductory Account of the early Operations of the Survey, during the period of 1800-1830. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey. Dehra Dún, 1870.
- Do. II. History and General Description of the Principal Triangulation and of its Reduction. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.
- Do. III. The Principal Triangulation, the Base-Line Figures, the Karáchi Longitudinal, N.W. Himalaya, and Great Indus Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1873.
- Do. IV. The Principal Triangulation, the Great Arc (Section  $24^{\circ}$ - $30^{\circ}$ ), Rahún, Gurhágárh and Jogí-Tíla Meridional Series, and the Sutlej Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1876.
- Do. V. Details of the Pendulum Operations by Captains J. P. Basevi, R.E., and W. J. Heaviside, R.E., and of their Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún and Calcutta, 1879.
- Do. VI. The Principal Triangulation of the South-East Quadrilateral including the Great Arc—Section  $18^{\circ}$  to  $24^{\circ}$ , the East Coast Series, the Calcutta and the Bider Longitudinal Series, the Jabalpur and the Biláspur Meridional Series, and the Details of their Simultaneous Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1880.
- Do. VII. General Description of the Principal Triangulation of the North-East Quadrilateral including the Simultaneous Reduction and the Details of Five of the Component Series, the North-East Longitudinal, the Budhon Meridional, the Rangír Meridional, the Amua Meridional, and the Karára Meridional. Prepared under the directions of Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
- Do. VIII. Details of the Principal Triangulation of Eleven of the Component Series of the North-East Quadrilateral, including the following Series; the Gurwáni Meridional, the Gora Meridional, the Huríláong Meridional, the Chendwár Meridional, the North Párasnáth Meridional, the North Malúncha Meridional, the Calcutta Meridional, the East Calcutta Longitudinal, the Brahmaputra Meridional, the Eastern Frontier—Section  $23^{\circ}$  to  $26^{\circ}$ , and the Assam Longitudinal. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
-

*List of Published Works of the Great Trigonometrical Survey of India—(Continued).*

Synopses of the Results of the Great Trigonometrical Survey of India, comprising Descriptions, Co-ordinates, &c., of the Principal and Secondary Stations and other Fixed Points, of the Several Series of Triangles, as follows;—

- Volume I. The Great Indus Series, or Series *D* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. II. The Great Arc—Section  $24^{\circ}$  to  $30^{\circ}$ , or Series *A* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. III. The Karáchi Longitudinal Series, or Series *B* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. IV. The Gurhágárh Meridional Series, or Series *F* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. V. The Rahún Meridional Series, or Series *E* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. VI. The Jogí-Tíla Meridional Series, or Series *G*, and the Sutlej Series, or Series *H* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. VII. The North-West Himalaya Series, or Series *C* of the North-West Quadrilateral, and the Triangulation of the Kashmir Survey. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.
- Do. VIII. The Great Arc—Section  $18^{\circ}$  to  $24^{\circ}$ , or Series *A* of the South-East Quadrilateral. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1878.
- Do. IX. The Jabalpur Meridional Series, or Series *E* of the South-East Quadrilateral. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1878.
- Do. X. The Bider Longitudinal Series, or Series *D* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XI. The Biláspur Meridional Series, or Series *F* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XII. The Calcutta Longitudinal Series, or Series *B* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XIII. The East Coast Series, or Series *C* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.



G. T. SURVEY OF INDIA.





SYNOPSIS OF THE RESULTS OF THE OPERATIONS OF  
**THE GREAT TRIGONOMETRICAL SURVEY OF INDIA**  
VOLUME XV.

---

DESCRIPTIONS AND CO-ORDINATES  
OF THE  
PRINCIPAL AND SECONDARY STATIONS AND OTHER FIXED POINTS OF  
**THE RANGIR MERIDIONAL SERIES**  
*OR SERIES K*  
OF THE  
**NORTH-EAST QUADRILATERAL.**

---

BY LIEUT.-GENERAL J. T. WALKER, C.B., R.E., F.R.S., &c., &c.,  
SURVEYOR GENERAL OF INDIA, AND SUPERINTENDENT OF THE TRIGONOMETRICAL SURVEY,  
AND HIS ASSISTANTS.



M e h r a   D u n :

PRINTED AT THE OFFICE OF THE TRIGONOMETRICAL BRANCH, SURVEY OF INDIA.

B. V. HUGHES.

1883.



# CONTENTS.



|                                                                                                       |    |    |    |                    |
|-------------------------------------------------------------------------------------------------------|----|----|----|--------------------|
| DIAGRAM OF THE NORTH-EAST QUADRILATERAL                                                               | .. | .. | .. | Facing title page. |
| CONTENTS                                                                                              | .. | .. | .. | iii                |
| ERRATA ET ADDENDA                                                                                     | .. | .. | .. | iv                 |
| REFERENCES                                                                                            | .. | .. | .. | v                  |
| PREFACE                                                                                               | .. | .. | .. | vii                |
| Introduction                                                                                          | .. | .. | .. | iii—K.             |
| Alphabetical List of Principal Stations                                                               | .. | .. | .. | 1—K.               |
| Numerical do. do.                                                                                     | .. | .. | .. | 2—K.               |
| Description of Principal Stations                                                                     | .. | .. | .. | 3—K.               |
| Principal Triangles                                                                                   | .. | .. | .. | 10—K.              |
| Secondary Triangles connecting Principal-Auxiliary Stations and Intersected Points                    | .. | .. | .. | 13—K.              |
| Azimuths of Surrounding Stations and Points, at Principal, Principal-Auxiliary and Secondary Stations | .. | .. | .. | 26—K.              |
| Co-ordinates and Descriptions of all Stations and Points                                              | .. | .. | .. | 34—K.              |
| Addendum to Description of Principal Stations                                                         | .. | .. | .. | 47*—K.             |
| CHARTS Nos. 1 and 2                                                                                   |    |    |    |                    |

## ERRATA ET ADDENDA.



PAGE

8—~~K~~.

line 27 from top

*for* (1794)*read* (1774)

" " " "

„ Naju

„ Háfiz Rahmat

Throughout the text the following points

Bádsháhpur

Muhammadabad

Chamári

Parbata

Gopálpur

Pola

Kálpi

Sháhabad

Kalra

Shamsabad

Maudó

have been treated and printed as if they had been visited stations, and have the letters s. or h.s. affixed to them. In the table of Azimuths, commencing on page 26—~~K~~, azimuths *at* these points of surrounding stations are given; this should not have been done. On the Charts, however, these points are correctly exhibited as *intersected* points.

January, 1883.

J. B. N. HENNESSEY,

*In charge of Computing Office.*

## REFERENCES.



The abbreviations employed in the text are as follows:—

|      |         |                         |
|------|---------|-------------------------|
| h.s. | denotes | hill station secondary  |
| s.   | „       | station secondary       |
| t.s. | „       | tower station secondary |

These abbreviations are only placed after stations where a theodolite has been set up and observations taken to surrounding points.

The latitudes and longitudes of all points shown on the Charts at the end of this volume will be found in the text. The latter exhibits numerical values of triangles only to points of a superior class, to which alone, if exhibited on the Charts, lines are drawn: these lines are either continuous throughout, or dotted for half the length and continuous for the other half: the dots indicate that the bearing was not observed, and in such cases numerical values of azimuths are not given. For other points, difficult to identify or of comparatively less accuracy, numerical values of triangles or azimuths are not given.

*January, 1883.*

**J. B. N. HENNESSEY,**  
*In charge of Computing Office.*



## PREFACE.



The Rangir Meridional Series is the second meridional series from the west of the sixteen chains of triangles included in the Section of the Principal Triangulation of the Survey of India which has been named the North-East Quadrilateral. This Section embraces the area within the Meridians of  $78^{\circ}$  and  $92^{\circ}$  and the Parallels of  $23^{\circ}$  and  $30^{\circ}$ ; and for reasons explained in Section 7 of Chapter I of Volume II of the *Account of the Operations of the Great Trigonometrical Survey*, its general reduction was postponed till that of the neighbouring Quadrilaterals, viz., the North-West and South-East, had been completed, whereby two of the Series, the Great Arc, Section  $24^{\circ}$  to  $30^{\circ}$ , and the Calcutta Longitudinal, entering the periphery of the North-East Quadrilateral, became finally fixed. The general principles of the Simultaneous Reduction, and the procedure followed in carrying it out, are the same as have been explained in Volume II of the *Account of the Operations, &c.*, and full details of the whole of the principal triangulation which is at present included in the Quadrilateral, will be found in Volumes VII and VIII of the *Account of the Operations, &c.*

As however the entire contents of the volumes of the principal triangulation are not needed by geographers and surveyors, and moreover as those volumes give no details of the secondary triangulation—which is of considerable value for local requirements—it is obviously desirable that synopses of the final results of the whole of the operations, including the secondary as well as the principal triangulations, should be published for general use, in such a form as to be most suitable for convenience of reference. This has already been done as follows;—

|                                                               |   |                    |  |
|---------------------------------------------------------------|---|--------------------|--|
| I. Great Indus Series.                                        | } | Already published. |  |
| II. Great Arc, Section $24^{\circ}$ to $30^{\circ}$ .         |   |                    |  |
| III. Karáchi Longitudinal Series.                             |   |                    |  |
| IV. Gurlágarh Meridional Series                               |   |                    |  |
| V. Rahún Meridional Series.                                   |   |                    |  |
| VI. Jogí-Tíla and Sutlej Series.                              |   |                    |  |
| VII. North-West Himalaya Series.                              |   |                    |  |
| For those also of the South-East Quadrilateral, viz.,         |   |                    |  |
| VIII. Great Arc, Section $18^{\circ}$ to $24^{\circ}$ .       |   |                    |  |
| IX. Jabalpur Meridional Series.                               |   |                    |  |
| X. Bider Longitudinal Series.                                 |   |                    |  |
| XI. Biláspur Meridional Series.                               |   |                    |  |
| XII. Calcutta Longitudinal Series.                            |   |                    |  |
| XIII. East Coast Series.                                      |   |                    |  |
| And for the following Series of the North-East Quadrilateral, |   |                    |  |
| XIV. Budhon Meridional Series.                                |   |                    |  |

The present is the 15th Synoptical Volume and the second of those appertaining to the North-East Quadrilateral, and it gives the results of the whole of the triangulation, both the principal, which was executed with theodolites having azimuthal circles of 15 and 18 inches in diameter read by 3 micrometer microscopes, and the secondary, which was executed with smaller theodolites read by verniers.

By the process of reduction which has been followed the principal triangulation has been rendered perfectly consistent, both internally and externally; internally, so that if in any one of the several polygonal figures of which the chains may be composed, calculations are carried from one station to another in every possible direction, the same results will be inevitably deduced; and externally, so that the values of the co-ordinates of any station, when computed from the given co-ordinates of any other station, with the final linear and angular data, will be the same, whether the calculation is carried directly through the series, or circuitously through any of the other chains of triangles comprising the North-East Quadrilateral. All secondary triangulations which emanate from one side of the principal series and close on another side thereof, or on a contiguous series, have also been made consistent throughout.

As regards the general arrangement of this volume, it is necessary to point out that the several sections have been prepared and printed at different times, and that the work has extended over several years. The Introduction and the Names and Descriptions of the Principal Stations were originally prepared for Volume VII of the *Account of the Operations, &c.*, and when a sufficient number of copies had been printed for that work, additional copies were struck off for the present Synopsis. The Alphabetical and Numerical Lists of Principal Stations, pages 1—*K*. and 2—*K*., were printed prior to the year 1868, when the general programme for the final reduction of the whole of the Triangulation of India was drawn up; there was then a long pause in the printing, while the Simultaneous Reductions of the North-West, South-East and North-East Quadrilaterals were being completed; this was done by the year 1877, when the secondary triangulation was adjusted in accordance with the principal, and then the printing of this volume was resumed.

The data given in this volume are the following:—

*First* (page 1—*K*.), an alphabetical list of the names of the principal stations, showing the numbers assigned to them, which were employed in the reductions as being more convenient to use than names.

*Second* (page 2—*K*.), a numerical list giving the names corresponding to the numbers.

*Third* (page 3—*K*.), descriptions of the principal stations—of their structure and positions—as taken from the original records of the observations, and supplemented by an Addendum, page 47\*—*K*., giving the most recent information of their condition which has been received up to date.

*Fourth* (page 10—*K*.), the angles and sides of the principal triangles, numbered and arranged in order from south to north.

*Fifth* (page 13—*K*.), the angles and sides of certain secondary triangles. The numbering is here made consecutive to that of the principal triangles, in order to facilitate references which are made in other sections to the place where the length of a side is to be found.

*Sixth* (page 26—*K*.), the azimuths of surrounding stations and points, at principal, principal-auxiliary, and secondary stations, the latter arranged in alphabetical order.

*Seventh* (page 34—*K*.), the co-ordinates and descriptions of all stations and points arranged in alphabetical order.

The heights of the stations depend in the first instance on the finally determined values of the stations of Tinsmál and Rangir of the Calcutta Longitudinal Series (of the South-East Quadrilateral), and of Sisgarh and Atária of the North-East Longitudinal Series. In addition to these fixed heights, the heights of Stations XIX, XX and XXXI were determined by the Spirit-leveling Operations of this Branch of the Department, and that of Station VII by similar operations of the Revenue Branch. The manner in which the heights of the remaining stations have been made to accord with those above designated, is explained in Section 7 of Chapter II, Part I of Volume VII of the *Account of the Operations, &c.* The datum to which all heights have been referred is the mean sea level of Karáchi (Kurrachee). It may be here stated that all trigonometrically determined heights invariably refer to the upper surfaces of the central masonry pillars which are constructed for the instruments to stand on. Spirit-leveled values sometimes refer to the upper surface and sometimes to the basement of the pillar, whichever the leveling staff was set on; a description of the exact point referred to is given in each instance in footnotes to the pages of the Co-ordinate List, commencing on page 34—*K*.



It has not been considered necessary to publish the whole of the details of the secondary triangulation, portions having been executed originally for preliminary geographical purposes, to facilitate the construction of a first map of India, and the objects observed having in many instances been flags and temporary marks which must long since have disappeared. The sides and angles of 320 triangles, which were selected as most likely to be still in existence and of future use, and the azimuths of all these sides, have been given; but for a number of other points the co-ordinates only have been given. With the aid of Nos. X, XI and XII of the *Auxiliary Tables to facilitate calculations of the Survey Department of India*, Dehra Doon 1868, local surveyors, working on a system of rectangular co-ordinates, can readily transform the spheroidal co-ordinates here given to suit their own requirements.

The Longitudes depend on an astronomically determined value of the longitude of the Madras Observatory,  $80^{\circ} 17' 21''$ , which was deduced about the year 1815. There has long been reason to believe that this value was about  $3'$  too great; but, pending the final determination of the longitude of the Madras Observatory, it has not been considered desirable to alter the value, which has therefore been maintained up to the present time. An electro-telegraphic determination of the longitude of Madras from Greenwich, commencing with the difference between Suez and Greenwich—determined, in 1874, under the superintendence of the Astronomer Royal—was completed in 1877 by the determination of the difference between Suez and Madras, by Captains Campbell and Heaviside, as a part of the operations of this Survey. The combined result places the Observatory at Madras in Long.  $5^{\text{h}} 20^{\text{m}} 59^{\text{s}}.42 = 80^{\circ} 14' 51''.30$ . Thus the following precept may be accepted with considerable confidence,—

**All the values of longitude in this volume require a constant correction,  
probably of  $-2' 30''$ .**

As regards the orthography of Indian names in the present volume. The Alphabetical and Numerical Lists of Principal Stations, at the commencement of the volume, were printed before the year 1868, in accordance with the rules introduced by Colonel Everest for use in the Survey Department. Subsequently, in 1874, several provincial lists of spellings, constructed under the immediate orders of the Government of India, were received; and thereafter the newly authorised spellings were adopted for all names and other words contained in these lists; but for words for which there was no specific authority, the spellings have been framed in accordance with the methods followed in the preparation of the published lists, reference being made in the present instance more particularly to the Gazetted List for the North-West Provinces. As a general rule the pronunciations of the vowels are as follows:—*a* has a variable sound as in woman, rural, paltry; *á* as in tartan; *i* as in bit; *í* as in ravine; *u* as in bull; *ú* as in rural; *o* as in note; *e* as *a* in say; *au* as *ou* in cloud; *ai* as *i* in ride.

The Charts accompanying this volume show the whole of the principal stations and triangulation, the positions of all the secondary points, and those portions of the secondary triangulations of which full details of the angles, sides and azimuths are given. With the aid of the Charts it is hoped that little difficulty will be met with in finding out any of the data which may be required. The descriptions of the secondary stations are in some cases not as full and clear as is to be desired: this arises from the inadequacy of the information entered on the spot by the surveyors in their field books; every effort has been made to supplement the field books, whenever it was found practicable to do so, in order to facilitate the future identification of the stations; all the information which is forthcoming has now been given.

The general arrangement of this volume and the preparation of the data which it contains have been the work, at different times, of Mr. Hennessey, M.A., F.R.S., Major Herschel, R.E., F.R.S., and Mr. Cole, M.A. Major Herschel moreover supervised the Simultaneous Reduction of the North-East Quadrilateral of which this Series forms a portion, while the Introduction to this volume was written by Mr. C. Wood, Surveyor 2nd Grade. Great pains have been taken to secure the utmost accuracy in preparing the data and passing them through the press.

CALCUTTA, }  
January, 1883. }

J. T. WALKER, LIEUT.-GENERAL, R.E.,  
Surveyor General, and Superintendent of the  
Great Trigonometrical Survey of India.



**RANGIR MERIDIONAL SERIES.**



RANGIR MERIDIONAL SERIES—(LONG.  $79^{\circ} 30'$ ).

## INTRODUCTION.

The Rangir Series is the second in order, reckoning eastwards from the Great Arc, of the meridional chains of triangles which are included in the North-East Quadrilateral. It is aligned, as closely as the nature of the country would allow, on the meridian of Rangir, *viz.*,  $79\frac{1}{2}^{\circ}$ . It emanates from the side Tinsmál-Rangir of the Calcutta Longitudinal Series, and extends over a meridional distance of about  $4\frac{1}{2}^{\circ}$ , up to the North-East Longitudinal Series. It was constructed throughout as a chain of single triangles, but with the introduction of a trigon around the station of Muhammadabad (xxii). For the first hundred miles of its length, it crosses the low hills which, generally speaking, may be said to form the northern outliers of the Great Vindhya range; and in this part of its course, it traverses portions of the modern districts of Saugor, Damoh, Jhānsi and Hamírpur and of the Native States which are affiliated with the Bundelkhand Agency. It then enters the great plains of the Gangetic valley, and after crossing portions of the modern districts of Jālaun, Etāwah, Farrukhabad, Shāhjahanpur, Budaun and Bareilly, terminates in the forests of the Tarāi at the foot of the Himalayan mountains.

The execution of the Series was originally entrusted to Lieutenant A. S. Waugh of the Bengal Engineers—afterwards Surveyor General—Lieutenant T. Renny of the same Corps being chosen at the same time to conduct the adjoining chain of triangles to the east, *viz.*, the Amua Series. Both these officers had recently been appointed to the Great Trigonometrical Survey, on the recommendation of Major Everest, the Surveyor General, with a view to the early commencement of these chains of triangles. But as they had had no previous experience of principal trigonometrical operations which were designed to subserve the requirements of Geodesy as well as Geography, Major Everest recommended that they should be primarily employed as assistants in the operations which were then being carried out on the Great Arc, in order to gain a practical knowledge of duties such as those which they were eventually intended to undertake, observing that “although both these gentlemen are highly talented as far as theory goes, they cannot be expected to conduct “duties of this sort intuitively”.

At the time when their appointments to the Great Trigonometrical Survey were sanctioned by the Government they were both in Calcutta; and as in marching from Calcutta to the scene of their operations, in Central India, they would have to pass through or near

certain localities of which “as little was known as of the heart of Africa”, Major Everest proposed that they should carry a rapid route-survey (supplemented by suitable descriptive notes) through the tracts in question. He drew up instructions for their guidance, which are given below *in extenso*\*, as they are interesting for the evidence they afford of the necessity which existed in those days for combining surveys of the roughest description, which were wanted to satisfy immediate geographical requirements, with operations of extreme precision, which were intended to form a permanent basis for all future survey operations.

Even the primary operation of selecting suitable sites for the stations of the principal triangulation was made to subserve the geographical requirements of the moment; it furnished approximate values of the positions of the stations themselves and of the hill

\**Extract of Instructions communicated to Lieutenants Waugh and Renny, by the Surveyor General in November 1832.*

The first obvious blank in all our maps is the mass of mountain land on which Rotasgurrh is situated.

The range called “Kula Phar” to the east of this which bounds the valley of the Soane may be generally laid down.

But as to the route over the mountain at the back of Rotasgurrh, this gap in our knowledge may well be filled up more particularly. I took a route of the tract between Rotasgurrh and Punnoogunge near Bijeygurrh in 1817, which is perhaps as accurate as route surveys in general. It was plotted very carefully by me from my field book and I lent it to Colonel Blacker for the purpose of facilitating the operations of my own people under Mr. Olliver in 1825. In that plan there is a road from Weenee branching off to Chunar left incomplete, the last place on it being Bogheelah. There is also a road from Dhobaee branching off to Chaenpoor from the road between Bijeygurrh and Sheergurrh, the most advanced place on it being Peeprah. If these two roads could be explored they would connect the details of my sketch with the general map, and the details would be filled up more satisfactorily still if direct roads can be found leading from Sheergurrh to Rotasgurrh, from Bijeygurrh to Chunar, and from Bijeygurrh to Rotasgurrh along the face of the mountains.

I leave it to your judgment to examine or not any portion of my route again. You may perhaps lay down the hills more accurately, which is an object, and as it was a very hasty performance, you may if you find any errors correct them, but I think you will find it as good as route surveys usually are.

Rough plans of Bijeygurrh and Sheergurrh will be of use as well as plans of any other hill forts on that range. Historical facts connected with Sheergurrh may be instructive. The tract to the southward of Sonegurra or Songurrh leading to Omurkuntuk is absolutely *terra incognita* and it is one of the most interesting parts of India both geologically and geographically. The route I wish to be explored is that leading to Omurkuntuk from Rajgurrh on the Soane, but you may be compelled to adopt some other route and I must rely on your prudence to take that which will afford the most information. Rajgurrh appears to lie in Latitude  $24^{\circ} 35'$  and Longitude  $82^{\circ} 6'$ , Omurkuntuk in Latitude  $22^{\circ} 40'$  and Longitude  $81^{\circ} 43'$ . Whatever route you take however, you must cross the southern face of the Kimoor range respecting which any particulars you can give will be interesting.

Your Latitudes and Longitudes will all be referred to the nearest principal stations of the Longitudinal Series of the Great Trigonometrical Survey, whenever you can manage to discover them.

Having explored the route to Omurkuntuk, you will proceed if possible along the northern bank of the Nerbuddah to Jubbulpore and from thence to Seronj, where you will fall in with the party under Mr. Rossenrode, and I wish you to take advantage of that opportunity to acquire a practical acquaintance with the method of conducting Trigonometrical operations in the field.

I need not point out to gentlemen of your good sense and talent how necessary it is to devote your whole energy to this object, and how manifest an advantage it is to you to enter on your career as geodesists with full liberty to use the splendid instruments of my department and try your hand at any part of the operations without apprehension of doing mischief. A course of regular operations could not hold out those advantages because business requiring the most scrupulous attention to accuracy is then to be performed; but in an approximate series, if you should make a wrong reading, it is but putting the pen through it, and the work will still be accurate enough for the object in view. I shall therefore trust to your own sense of propriety to lose no opportunity of qualifying yourselves to take charge of a party on one of the independent meridians; but when you can do so without injury to this principal object, I wish you to furnish as many data for the topography of the country within the Series as you can collect.

#### *Data.*

Barometer to be observed every day three times if possible at the same hour.

Two Barometers to be observed simultaneously when the depths of the beds of rivers or the heights of mountains are required.

Angles of elevations of any high peaks to be observed from two places whose distance is known, as well as the horizontal angles, so that the distances and heights of the main features of the country may be fixed.

Courses of rivers.—Where they emerge from the mountains to the plains. Their height at flood. Their minimum if perennial. Their period of drought if dried up. Locality of their sources. The strata they pass through, and the breadth of their beds. The depth of the channel as respects the surrounding country. Whether the banks are steep or cut into ravines or sloping.

Nature of the country passed through.—If a valley, how bounded, by high hills or low? The nature of those hills. Are they of primary or secondary formation? Do they contain mines of coal or marble or asphaltum or rock-salt, &c., or is there gold, lead, copper, &c.

peaks, towns, villages or other prominent objects seen from them, by observations taken with small theodolites or sextants during the course of the general reconnaissance of the country. The preliminary triangulation thus executed came to be called the Approximate Series, for it was intended to serve as a *pis aller* until the principal observations with the great theodolites could be completed. It was invariably pushed on as rapidly as possible without regard to nicety, observations being taken sometimes from trees and lofty scaffolds in the plains, and sometimes to distant torches and blue-lights which could be seen with the aid of nocturnal refraction over intervening obstacles, before the 'rays' between the principal stations had been cleared for the final observations.

Lieutenants Waugh and Renny started from Calcutta early in the field season of 1832-33, with two assistants. After carrying out, as fully as was possible, the instructions they had received for making route-surveys and drawing up reports of the *terra incognita* through which they had to pass, they reached the camp of the party which was then employed on the Great Arc, at the principal station of Mao, in the Gwalior territory, about 18 miles from the town of Sipri. They devoted the remainder of the field season to acquiring an insight into the nature of the operations of the principal triangulation and some practical familiarity with the details.

The following recess was spent in Agra, where both officers were for some time occupied in bringing up their maps, plans, and reports on the route-surveys which they had recently accomplished, and afterwards in making preparations for commencing—in the next field season—the chains of triangles which had been respectively allotted to them.

Lieutenant Renny's subsequent operations being described in the Introductory Account of the Amua Series, we have here to deal only with those of Lieutenant Waugh, on the Rangir Series.

The party which was intended to break ground on this Series was constituted as shewn

Season 1833-34.

PERSONNEL.

Lieut. A. S. Waugh, Bengal Engineers, 2nd Assistant.  
Mr. J. W. Armstrong, 3rd Class Sub-Assistant.  
„ W. R. Forster, „ „

in the margin. It was furnished with an 18-inch theodolite by Cary for the principal observations\*, with two 7-inch instruments for the secondary work, and with such other equipment as was deemed necessary. It started from Agra on the 30th of November 1833, and marching

---

to be found in them? How far from water carriage? Mineral springs, hot or cold. The order of the strata shewn in the beds of rivers and the bare sides of mountains.

Manners and language of the people.—Are they Hindoos or Mahomedans, or what is their religion? Are they obliging or hostile to strangers? To what state of civilization have they attained? Their progress in agriculture, manufactures, &c. The weapons they use. The language they speak. Are they a truth-telling people or deceitful and prone to falsehood? If the inhabitants are wild, are the settlements formed by the natives of Hindoostan amongst them numerous?

Fertility of the country.—Are there means of irrigation? Does the country admit of such being constructed, as building dykes? Number of crops a year? Are the people generally comfortable or oppressed? Are they wandering tribes, or attached to their homes?

Is the country open or covered with forest? What kinds of trees are found in the forests? Enumerate the different kinds of building wood to be met with. Are ebony and other kinds of wood fit for cabinet work found there? Of building materials, what means of water carriage? Drawings of curious temples, and all objects tending to illustrate the manners, customs, history, geology, and natural and artificial features of the country will be acceptable.

\* Known as Cary's 18-inch L; for a description of this instrument see page 69 of the Appendices to Volume II.

*vid* Gwalior, Datia, Jhānsi and Saugor, arrived at Rangir about the 6th of January 1834.

Here Lieutenant Waugh commenced operations by taking a set of circumpolar star observations for determining a fundamental value of the azimuth, which was to be employed instead of the value that had been brought up through the Longitudinal Series from Kaliānpur. He then proceeded to lay out the triangulation, employing the side Rangir-Tikaria as his base, in conformity with the instructions he had received from Major Everest. But the ground immediately to the north of that side proved utterly impracticable for the extension of the triangulation therefrom; for the side was of considerable length—over 30 miles—and was confronted by a portion of the Vindhyaçal range which here develops itself into a mountainous table-land of considerable breadth, covered with high forest trees and dense underwood, and devoid of any commanding eminences. Thus the selection of symmetrically situated stations was a very difficult task to accomplish.

Lieutenant Waugh reported that after “having traversed the whole range and observed from nearly every high tree and rising ground”, his endeavours had all been in vain to advance the Series in any other way than by constructing a tower station 35 feet high at Saipur on the hills to the north of Rangir to command the view. The tower was commenced, and it was being built of stones set in clay instead of mortar, and had attained a height of 10 feet, when the water supply failed; the remaining 25 feet was run up with dry stones, and it came tumbling down almost immediately after completion. This disaster, combined with the circumstance that it would be necessary not merely to rebuild the tower at Saipur, but to construct a tower 60 feet high on the Sonha hills, at a considerable cost, if the originally intended side of origin was to be maintained, eventually induced Lieutenant Waugh to adopt the side Tinsmál-Rangir as the origin of the Series. At first however he loyally endeavoured to carry out the instructions he had received, reporting progress constantly and soliciting further orders; but the postal arrangements in those regions were so defective that he frequently did not receive answers to his letters to the Surveyor General in less than two months. A change of base involved the rejection of the work of several months which a young officer might well shrink from doing on his own responsibility; but immediate action was necessary, and Major Everest when all the facts were reported to him, at once approved of the change, saying that it was quite sufficient “if one flank of the Series—it did not matter which—was kept close to the meridian of the operations”, and giving as an illustration the Great Arc Series which “runs as often on one side of the meridian as the other” and follows the principle of “not fighting with a difficult tract when its flank can be turned”. As regards the two towers which were required for the triangulation from the original base, Major Everest wrote that he preferred “vitiating the symmetry of the triangles to having towers of 60 feet in a hilly country to start with; the notion is startling and must be abandoned”.

Thus after five months of harassing anxiety and failure, during the best time of the year for field operations, Lieutenant Waugh found himself compelled to commence work on a new base at the time when the field season was nearly ending. But he had resolved that, in spite of all the difficulties which had beset the work at the very outset, the Rangir Series should not be found “to have fallen in arrears or have lagged behind its neighbours”.



He remained in the field until the end of July, so as to avail himself of the clearing of the atmosphere which usually takes place when the rainy season commences; and he succeeded in observing the angles of the principal triangles up to the side Nágonáth-Phára, (VIII-IX) thereby completing the Series for a distance of 100 miles, and achieving an admirable out-turn of work in an unusually short space of time. Even the operations in the first five months of the field season, though a failure as regards the advancement of the principal triangulation, were fruitful in results of much value for immediate geographical requirements; as a large area of country had been reconnoitered, and the positions of several towns and forts of importance, lying mostly in Native States as yet unsurveyed, had been fixed from various secondary stations at which observations were taken with the small theodolites in the course of the search after suitable sites for the principal stations.

The latter 40 miles of the season's work on the Rangír Series lay in the Hamírpur District, which was suffering so terribly at the time from famine that Mr. Pidcock, the Settlement Officer of the district, reported that the season was one of unparalleled distress to the people and loss to Government,—the miseries of famine, pestilence, and exile having denuded the district of nearly one-half of its population.

In submitting from recess quarters the computations of the field season's operations, Lieutenant Waugh noticed with much regret the presence of *triangular errors* of over six seconds in the 5th and 6th principal triangles. He stated that he would have re-observed the angles had it not been for the impossibility of procuring further supplies of food for his people; being diffident of his skill as an observer he said that though not conscious of any remissness in this particular portion of the work, he could not but suppose that the errors "arose chiefly from bad observations". It is now however quite certain that the errors were due not to the observer but to the instrument employed, which was soon found to be of inferior value and was discarded.

Lieutenant Waugh's out-turn of work during the year consisted of a set of circumpolar star observations for azimuth; 8 principal triangles; 21 secondary triangles of the first class, and 43 of the third class; the elevations of all the principal and of 26 secondary stations, also a skeleton plan of the triangulation and a reconnaissance of the tract of country operated in. The latter included a part of Bundelkhand of which Lieutenant Waugh remarked that "it was peculiarly favourable for secondary work; the detached granite ridges command extensive views; forts and temples perched on eminences abound; indeed a complete map might be made by triangles of the 1st, 2nd, and 3rd classes, and had it not been for the difficulties which beset my *debut*, I should have formed such a map without at all delaying the Principal Series".

The chain of triangles had now been carried into the plains of the Gangetic valley, only one more hill remaining to offer its friendly assistance in presenting a suitable site for a station of observation. One-third of the chain was complete, all of which—with the exception of the first triangle, measured in the course of the operations of the Calcutta Longitudinal Series—had been achieved by Lieutenant Waugh in a single year, under many and great difficulties as already set forth. Nevertheless the completion of the remaining two-thirds occupied nearly eight years to accomplish. The great retardation in the subsequent rate of

progress was due to two causes. *First*, at every station in advance—with the single exception of the hill of Gokulphāra—towers had to be constructed to furnish stations of observation, and on sites carefully selected so as to present the fewest possible obstacles on the lines between the stations; moreover all obstacles to mutual vision had to be removed before the final observations could be commenced. *Secondly*, in order to construct a chain of triangles composed of as few links as possible, the sides of the triangles in the plains were maintained throughout at so great a length that the rays between the stations grazed the surface of the ground for a distance of several miles, thus making distinct mutual visibility impossible, excepting under unusually favourable atmospheric conditions which were of very rare occurrence.

The building of towers required the co-operation of the Department of Public Works; the Surveyor General had therefore moved the Government to issue the necessary instructions to that Department. Although anticipating that some delay would occur before the arrangements for the construction of the towers could be matured and suitable designs prepared, he was nevertheless confident that the building of artificial elevations of some sort or other would eventually be sanctioned. He accordingly issued instructions that field operations should be resumed during the ensuing field season, but that they were to be restricted to the selection of suitable sites for future tower stations. At the same time he prescribed a method of 'ray-tracing', for site-selection, by carrying a traverse with a theodolite and perambulator over each ray, with a view to effecting a close examination of the ground in each instance, before the final adoption of the sites and the commencement of ray clearing. *Vide* Section 3 of Chapter II of Vol. II.

In the following field season the party started from Cawnpore on the 10th of October.

*Season 1834-35.*

PERSONNEL.

Lieut. A. S. Waugh, Bengal Engineers, 1st Asst.  
Mr. J. W. Armstrong, 2nd Class Sub-Assistant.  
" W. R. Forster, 3rd " "

Lieutenant Waugh wrote a circular letter to the Civil Officers of the various districts through which his operations would have to pass, pointing out his dependence upon them for obtaining labour and supplies, and explaining the necessity for the removal of all obstructions on

the lines between the principal stations; he said that great care would be exercised both by himself and his assistants not to inflict more injury in the removal of obstacles than was absolutely necessary, and due recompense would be readily made for all property destroyed; also that as he had no leisure nor inclination for entering into disputes with the owners regarding the cutting down of trees or removing of other obstacles, he trusted the Civil Officers would issue plain and positive orders for his support. This timely explanation of matters led to very happy results in the substantial assistance which was rendered to the surveyors throughout the field season.

Writing from Kanwa (xii), where the ray-tracing was begun on the line to Gura (xi), Lieutenant Waugh reported that the country thereabouts abounded with mud forts situated on the high lands. "Some of these", he said, "are uninhabited, with defences ruined, and presenting a rude mass with steep sloping sides; they are solid, and a station placed in the middle would be permanent even were the sides to crumble away to a slope of 45° which is an event improbable, considering the tenacity of the material and its dis-

“position in successive strata or layers, according to the usual habit of the natives in building earthwork”. Other forts were partially tenanted, and had solid towers which could be used as stations. Again, eminences were met with which were crowned with old and untenanted brick buildings, and occasionally with domed temples. It was expected that many of these structures might serve as basements for the stations of the principal triangulation, and thus obviate the construction of towers of the great height which would otherwise be necessary in order to secure mutual visibility over the plains.

Having reconnoitred the country and given a good start to the operations, Lieutenant Waugh was summoned by Major Everest, towards the end of November, to assist in the measurement of the Dehra Dún Base-line, leaving the work on the Rangír Series under the supervision of Mr. Armstrong, the senior of his two assistants. On the completion of the base-line he returned to the charge of the Series, joining Mr. Armstrong in camp on the 20th May.

The party kept the field till the end of June. By this time all the rays had been cleared up to the side Chandanpur-Pothári (xxi-xxiii), and stations had been selected up to the side Janjiri-Gajnera (xxix-xxx), thus furnishing as the out-turn of the season's work a symmetrical series of 20 triangles, of the first 13 of which the rays were all cleared. In reporting on the field season's operations, Lieutenant Waugh stated that “the chief portion of this work having been done during my absence by Mr. J. W. Armstrong, any merit it may possess, either quantitatively or qualitatively, is entirely owing to his zeal and abilities. I have on former occasions borne testimony to the talents and good conduct of Mr. Armstrong as well as Mr. Forster, and I may now add that their efficiency keeps pace with their experience. Their labours during the last season, in the novel and arduous undertaking of carrying a series across the plains without any resource but what their judgment might suggest, so greatly surpass my expectations that it becomes a pleasing duty to me to bring them to the particular notice of the Superintendent”.

During the following recess season, Lieutenant Waugh supplied carefully prepared drawings and estimates of the masonry columns that would be required at the first ten of the tower stations in the plains. These were designed simply for the support of the large theodolites which would be employed in the measurement of the principal angles; they were further intended to mark the station permanently. The surrounding platform for the support of the observer, his attendants, and the observatory tent, was to be constructed as a portable scaffolding, which would be removable at pleasure, in order to be employed alike at all the stations; bamboo ladders were to be erected for the use of the signallers whenever the scaffolding was not available. The early construction of the masonry pillars was very desirable; therefore, in forwarding the designs for them to the Government, the Surveyor General pressed for an early decision, as otherwise the progress of the Series would be arrested. Thereupon the Military Board—to which the general construction of all public works was then entrusted—was directed to adopt the necessary measures for the construction of the required columns of masonry, in communication with Lieutenant Waugh.

The party had already (3rd October) taken the field when the orders of Government

were received. As the erection of the masonry columns would take some time, no final observations were contemplated this season. The party was therefore to be occupied in clearing rays, selecting stations and also in measuring the angles approximately—with small theodolites—for immediate geographical requirements.

*Season 1835-36.*

PERSONNEL.

Lieut. A. S. Waugh, Bengal Engineers, 1st Asst.  
Mr. J. W. Armstrong, 1st Class Sub-Assistant.  
„ W. R. Forster, 2nd „ „

Early in this season the services of Lieutenant Waugh were again drawn off to assist Major Everest, whose health was in such an unsatisfactory condition that his medical advisers strongly recommended him to abjure all further active field work and proceed to sea. The Surveyor General was most anxious to finish the operations on the northern section of the Great Arc; and at the same time he wished to guard against any sudden emergency, by having with him an officer in whose hands he could confidently leave the conduct of those operations, the early completion of which was of great importance in the interests of geodesy. Accordingly, with the sanction of Government, he directed Lieutenant Waugh (on 8th December) to repair with as little delay as possible to the Head Quarters of the Great Arc party which was then at Kaliána—the northern astronomical extremity of the Arc. Thus the management of the Rangir Series was again left in the hands of Mr. Armstrong, an officer to whom it could be confidently entrusted.

The ray-clearing and approximate measurement of the angles was carried on without cessation, and under many difficulties, until the 22nd of June, when the rainy season set in with such violence as to prevent further operations in the field. Fourteen rays had been cleared and approximate angles measured between stations previously selected, thus bringing this part of the operations up to the side Janjiri-Gajnera (xxix-xxx). Five stations were selected further north, by which the Series was extended to the outer Himalayas.

Meanwhile the Executive Engineer of the Cawnpore Division was proceeding with the construction of the ten masonry columns which were required to be erected at the principal stations, in accordance with the designs previously furnished by Lieutenant Waugh. At the station of Atsu (xvi), in the Etawah District, the overseer was completely thwarted by the determined opposition of a zemindar, Zálím Sing, the owner of a fort where a column was to be erected, the site for which he had originally given over voluntarily for the purpose; but when the overseer appeared on the scene, just one year afterwards, Zálím Sing put forward the most frivolous pretexts for holding back from his concession, and even went the length of building around the very spot which had been chosen. The overseer was compelled to suspend his operations, and a lengthened correspondence with the Civil Authorities ensued. Lieutenant Waugh pointed out that any change made in the site of the station would involve a loss to Government of Rs. 1,700, which should be defrayed by the zemindar as it would be due solely to a breach of faith on his part. This argument produced more practical results than all former persuasion had done; and it was finally settled that Mr. Armstrong should proceed to the spot, early in the following field season, and set the overseer to work, after personally arranging matters with Zálím Sing.

During the recess—which was spent at Bareilly—Mr. Armstrong prepared designs and estimates for fourteen columns remaining to be erected, and of modifications to the column

at Bisungarh (xx), which had been found to require an increase of 9 feet to its height, in order to be seen from the two forward stations.

Mr. Armstrong marched, on the 26th September, from Bareilly to make the necessary

*Season 1836-37.*

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.  
 „ J. Mulheran, 2nd Class „

arrangements regarding the construction of the column at Atsu (xvi). It was found that the zemindar still objected to give up the site which he had originally conceded; he was probably more influenced by the idea of preserving his dignity than any other reason; for he willingly gave another site, within a few feet of the first, but still at a sufficient distance to necessitate a partial reclearing of all the rays between Atsu and the surrounding principal stations, a work which occupied several days.

Mr. Armstrong then proceeded southwards to examine the columns which had been built by the Department of Public Works, and clear the rays of whatever vegetation had sprung up on them during the period of two years which had elapsed since they were first opened. He found the condition of some of the columns far from satisfactory. At Husapura (xiv) so much deflection had taken place, owing to insufficient foundation and bad workmanship, that the column was in a dangerous condition and had to be rebuilt; arrangements for this were immediately made, as the column would be soon wanted in the course of the measurement of the principal angles. The columns at other stations had also become deflected to an extent which rendered it impossible to suspend a plumb-line from the centre of the summit, through the hollow core, over the centered markstone on the ground-level at the base; but this defect was got over, partly by moving the markstone, and partly by adding a capital of larger diameter to the pillar, to increase its upper surface and thus permit of the theodolite being set up excentrically. Elsewhere the columns were found to be “correct and adapted for final work”.

Mr. Armstrong then proceeded to Cawnpore to take over the portable scaffolding which was to be employed around the columns at each station; these had meanwhile been constructed by the Ordnance Department, from designs supplied by the Surveyor General. No description of the so-called portable scaffolding is now forthcoming; but some idea of its bulk may be formed from the circumstance that no less than 10 four-bullock carts were required for its transport.

By the end of November everything was ready at the first ten tower stations for the measurement of the principal angles, and arrangements had been made for constructing columns at fourteen stations in advance by the Bareilly Division of the Department of Public Works. Mr. Armstrong therefore proceeded to Gokulphára (x) to resume the final observations, taking with him an 18-inch theodolite—Cary’s L, described at page 69 of the Appendices to Vol. II—to employ in the measurement of the principal angles. By the 10th April, the whole of the horizontal angles had been measured at stations viii to xvii inclusive. The measurement of the vertical angles had however terminated at stations ix and x, because satisfactory verticals could not be obtained; consequently this part of the work was postponed until arrangements could be made for taking simultaneous reciprocal observations, with the assistance of a second observer and instrument.

Observations were being taken at Birona (xviii), and two-thirds had been completed,

when, on the night of the 10th April, the portable scaffolding was set on fire; being very inflammable it was completely destroyed in the course of a few minutes. When access to the summit of the station was obtained next morning by ladders, the instrument appeared at first "to have escaped the effects of the flames"; but eventually it was found to be so damaged as to have become practically useless. The origin of the fire remained a mystery, but is believed to have been purely accidental. This catastrophe, happening in the month of April, necessarily put a stop to all further measurements of the principal angles during this field season.

During the following recess Mr. Armstrong was furnished with another 18-inch theodolite—Cary's M. O., described at page 68 of the Appendices to Vol. II; he was also directed to proceed to Agra, to superintend the construction of another portable scaffolding, with such assistance as he might obtain from the Ordnance Magazine at that place.

Provided with a new scaffolding, Mr. Armstrong commenced the operations of the

Season 1837-38.

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.  
 „ J. Mulheran, 2nd „ „

field season of 1837-38 by final observations at Bisungarh (xx). Though detained there for sixteen days—from 24th October to 9th November—he was unable to complete the horizontal angles, but succeeded in measuring the vertical angles simultaneously with Mr. Mulheran, who took the reciprocal angles at the surrounding stations. He then proceeded to Kalsán (xix), where, though he again succeeded in executing his share of the reciprocal verticals, he was still unfortunate as regards the horizontal angles; the condition of the atmosphere was such as to prevent him from obtaining a sufficiently satisfactory view of the signals at the surrounding stations to enable him to measure the angles between them with the requisite degree of precision. Attributing the state of the atmosphere to unprecedentedly high winds, with concomitant clouds of dust, which then prevailed in the immediate vicinity of the River Ganges, he thought it advisable to lose no more time in that neighbourhood, and, passing over three stations—xxi, xxiii and xxiv—he set up his theodolite at Guri (xxv). Here he was detained a whole month, the out-turn of which was only two principal horizontal angles and simultaneous verticals on two rays, besides a set of experimental observations to circumpolar stars for azimuth. The next three weeks sufficed but to take the principal horizontal angles at Dháka (xxvi) and the verticals on the ray to Saipur (xxvii). It was now the 5th of February, and during the next month all that he was able to finish was the measurement of the angles, horizontal and vertical, at the stations of Saipur and Kasrak (xxviii). In writing from the latter station on the 5th of March, Mr. Armstrong reported that owing to the reverses which he had experienced from the state of the atmosphere, he had "only completed two entire triangles on the south side of the Ganges and three triangles on the north side," besides of course the vertical observations which he had advanced *pari passu* with the horizontal measurements. It was his intention at the time to continue his progress as far north as he could proceed in the month of March, and then to return and finish the work below. He made comparatively good progress during the remainder of the month, completing the horizontal and vertical angles up to and including the side Gajnera-Fatehganj (xxx-xxxi), as well as a good number of secondary angles. He then retraced his steps to Guri (xxv), where between the 15th and 19th April he ob-

served the principal angle between the side Pothári-Mau (xxiii-xxiv), the verticals on two rays, and some secondary angles. He next moved on to Mau where he remained until the 8th of May by which time he was able to finish the three principal angles, the verticals along the ray to Dháka, and the secondary angles to surrounding stations and points. But unfavourable weather again set in, and Mr. Armstrong moved into the station of Fatehgarh where he was to spend the recess; there he employed himself on the computations, at the same time holding himself in readiness to start for his next station Pothári (xxiii) whenever the weather might permit; but dust storms continued to prevail persistently and with unusual frequency and violence; thus he was unfortunately unable to take the field again this season in order to bridge over the gap in the triangulation in the immediate vicinity of the Ganges.

The pillars built by the Department Public Works this year in the Farrukhabad and the Bareilly districts, as far north as Fatehganj, were very favorably reported on by Mr. Armstrong who found them in general well built, steady and symmetrical.

The resumption of field operations in the season of 1838-39, was delayed, because the

*Season 1838-39.*

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.  
 „ J. Mulheran, „ „

severity of the preceding rainy season had done considerable damage to the portable scaffolding. It had been left standing at the station of Pothári (xxiii), until the month of August when Mr. Armstrong brought it in to Fatehgarh,

for protection against further injury and for subsequent repairs; he experienced considerable difficulty in so doing because of the state of the roads and the large number of carts required for its transport. The damage done to the scaffolding took some time to repair, which, with delays in obtaining carts, prevented Mr. Armstrong from taking the field earlier than 25th December 1838. By the 19th of the following month, he had only succeeded in measuring three principal horizontal angles at the station of Pothári and in taking verticals on the rays to Chandanpur (xxi) and Mau (xxiv). He then moved on to Chandanpur, and completed three angles at this station and the verticals on the ray to Mau, by the 3rd of February. Here he received information of the fall of the pillar at Bagwára (vii of N.E.L.S.); he therefore moved the Executive Engineer of the Bareilly Division to have the pillar rebuilt with all possible despatch, as it would be required for use by the end of March. The station next visited was Bisungarh (xx); the horizontal angles were completed by the 11th of the same month, but no verticals could be obtained. For some unexplained reason Mr. Armstrong was unable to go down southwards, and complete the angles which remained unmeasured at the stations of Biróna (xviii) and Kalsán (xix). This deficiency was not made good for another season.

From Bisungarh Mr. Armstrong marched northwards to the station of Gajnera (xxx), where he arrived on the 12th of March; by the 18th he completed the horizontal angle between Fatehganj (xxxi) and Atária (xi of N.E.L.S.), and had taken verticals on the ray to the latter station. By the 23rd of March, the horizontal and vertical angles at Fatehganj were concluded, and the party was on its way to Atária. The pillars at this station and at Sísgarh (x of N.E.L.S) were found to be very much out of the perpendicular; the former moreover was in a somewhat dangerous condition, several cracks having taken place both

in the shaft and the basement. Though somewhat apprehensive that the pillar at Atária might fall down, Mr. Armstrong set up his large theodolite on it, rather than postpone the observations until it could be rebuilt; it was so much deflected however that the instrument could not be plumbed over the mark-stone in the basement; four small pillars were therefore built round the station, with a mark on each, and these marks formed a quadrilateral figure the diagonals of which intersected in the normal of the point of observation. By the 16th of April, the horizontal and vertical angles at this station and at Sísgarh were disposed of; and by the 3rd of May the ray from Beheri (ix of N.E.L.S.) to Bagwára (vii of N.E.L.S.)—left uncleared in 1836—had been cleared, and the horizontal angles at Beheri had been measured. The work at Bagwára was concluded by the 19th idem, some delay having been occasioned by the necessity for further clearing on the ray to Sísgarh\*. The party then proceeded to recess quarters at Bareilly.

At the commencement of the field season of 1839-40 Mr. Armstrong was required

*Season 1839-40.*

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.  
 „ J. Mulheran, „ „

to proceed to the camp of the Great Arc party in the Meerut District, to receive instructions and exchange his large theodolite for Harris and Barrow's 15-inch theodolite—described at page 72 of the Appendices to Vol.

II—which had recently been employed with very satisfactory results on the Budhon Series.

Returning to resume field operations, on the 11th November he reached Fatehgarh, where he found his assistant, Mr. Mulheran, on whom he was dependent for the reciprocal observations, completely prostrated with a malarious fever. For this and other reasons the party was detained at Fatehgarh until the 6th of January.

The progress made during the next two months was very small, comprising only the measurement of the two northern horizontal angles at Kalsán (xix), and verticals on the rays Pothári-Guri (xxiii-xxv) and Seontára-Birona (xvii-xviii). By the 21st of April, Mr. Armstrong completed the horizontal angle that had remained unobserved at Birona as well as the simultaneous verticals on the fifteen rays that had hitherto existed as a gap between the side Phára-Gokulphára (ix-x), and Seontára-Birona (xvii-xviii). The party then returned to Fatehgarh. Here Mr. Armstrong found instructions awaiting him from the Surveyor General, directing him to proceed to the Head Quarters at Dehra Dún with the whole of the establishment and instruments under his charge, leaving the portable scaffolding and other heavy ordnance stores in deposit at the Gun Carriage Agency in Fatehgarh.

On the 1st of the following October, Mr. Armstrong started from the Head Quarters

*Season 1840-41.*

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.  
 „ J. Mulheran, „ „  
 „ W. C. Rossenrode, 3rd Class „

to commence the field operations of 1840-41, and proceeding *viâ* Fatehgarh marched to Muhammadabad (xxii), where a new station was to be established for azimuth observations, which had also to be connected with the surrounding stations. A tower 16 feet high was erected on the bastion

---

\* Mr. Armstrong reported that when he was observing at Sísgarh in April, the refraction was so great as to enable him to see the heliotrope at Bagwára over every obstruction. Unfortunately this was not the case during the reciprocal observations.



of the fort at Muhammadabad, the construction of which was completed in time for the star observations to be commenced on the 25th December. The azimuth was determined by observations to  $\delta$  Ursæ Minoris at both elongations. These observations, as well as the measurement of all the horizontal angles of the three triangles connecting xxii with the surrounding stations xx, xxi and xxiii, were completed by the 12th February.

Mr. Armstrong was then transferred to Lieutenant Waugh's party, which was operating near Hyderabad in the Nizam's dominions. Mr. C. Lane, 1st Class Sub-Assistant, was placed in charge of the Rangír party, which he assumed on the 1st of March. Mr. Mulheran extended the Approximate Series in advance into the outer Himalayan Mountains by four triangles, of which the northernmost station (Khánkra) was fixed beyond the 30th parallel of latitude. But these triangles were subsequently incorporated into the North-East Longitudinal Series, at the side of junction with which—Sísgarh—Atária—the Rangír Series is now considered to terminate. Anything that may have to be stated of the triangulation beyond, which was originally executed as a part of this series, will therefore appear in the Introduction to the North-East Longitudinal Series.

The remaining operations in connection with the principal triangulation of the Rangír Series, as at present constituted, were as follows. *First*, in the field season of 1841-42 the vertical angles at and between stations xx and xxi to xxiii, which had not been previously observed were measured reciprocally by Mr. Lane and Mr. Rossenrode, observing simultaneously. *Finally*, in the season 1863-64, when Mr. George Shelverton reached Rangír, during the course of the revision of the Calcutta Longitudinal Series\*—the station was found to have been so much injured that there was every reason to believe that the markstone, which was forthcoming in the *débris*, must have been displaced. Happily the marks at the stations of Tinsmál and Kusmár—which, with Rangír, form the first triangle of the chain—were uninjured. Mr. Shelverton therefore constructed a new station at Rangír—in the centre of the *débris* of the first station—and measured the three angles of the triangle Rangír-Tinsmál-Kusmár, and thus connected the Rangír Series with the revised Calcutta Longitudinal Series.

The contrast between the rapid completion of the lower third part of this Series, which is situated in a hill country, with the slow execution of the upper two-thirds which is situated in the plains, has already been noticed at pages vii and viii of this Introduction. The principal cause of the slow progress in the plains was that the sides of the triangles were made of a length which averaged from 18 to 19 miles, and occasionally exceeded 22 miles. Such sides are much too long for satisfactory observations between towers of even the considerable height of those which were erected for the principal triangulation. Thus the measurement of the horizontal angles proceeded very slowly; that of the vertical angles had frequently to be performed so long after the time of minimum refraction that simultaneous reciprocal

---

\* See Vol. II, pages 19 and 71; also Vol. VI, page vii—B.

verticals were often essential to secure even moderate accuracy; and this not only necessitated the employment of a second observer with a complete instrumental equipment, but greatly retarded the progress of the operations. The experience gained on the Rangir Series led to an immediate and very sensible reduction in the lengths of the sides of the triangles in the plains. And further experience showed the desirability of still further reductions in length, in order to obtain the great advantage of mutual visibility at the time of minimum refraction, between tower stations of moderate height; thus eventually an average of 11 miles—ranging from 9 to 13—has come to be recognized as the most suitable length for the sides of the principal triangles in the plains; see Chapter II of Vol. II.

The triangulation of the Rangir Series has been included in the Simultaneous Reduction of the North-East Quadrilateral. The errors actually dispersed on this Series between the origin, Tinsmál-Rangir, and the terminus, Sísgarh-Atária, are:—

|         |                                                                     |     |     |          |
|---------|---------------------------------------------------------------------|-----|-----|----------|
| In side | { Logarithm            ...            ...            + 0·000,0144,9 |     |     |          |
|         | {        giving a ratio of about $2\frac{1}{8}$ inches per mile.    |     |     |          |
| „       | Latitude                                                            | ... | ... | + 0"·433 |
| „       | Longitude                                                           | ... | ... | + 0·796  |
| „       | Azimuth                                                             | ... | ... | + 11·597 |

The dispersion of these errors by the Simultaneous Reduction of the North-East Quadrilateral was effected by the method of least squares, as described in Part I of Vol. VII.

The trigonometrical determinations of the heights of the stations of this Series above the mean sea level have been corrected by connecting the stations, wherever possible, with the lines of spirit levels which have been executed of late years in the course of operations in the Trigonometrical and Revenue branches of the Survey Department. A list of the stations which have been so connected will be found on page 43—K. [of Vol. VII]; a statement of the several sections into which the series is divided, as well as the method of adjustment employed is given in detail on page 38 of Part I of Vol. VII. It will here suffice to state that the spirit levels shew that occasional errors of a magnitude which reaches a maximum of 14·5 feet between contiguous stations were made in the trigonometrical determinations; and that the cumulative error in the entire Series, from origin to terminus, is about 52 feet. This large accumulation of error is unquestionably due to the great lengths of the sides of the triangles in the plains, which has already been shewn to have been a cause of great delay in the progress of the operations, and which frequently compelled the measurement of the vertical angles to be made at other times than that of minimum refraction. An inspection of the values of the refraction—in seconds, and in decimals of the ‘contained’ arc—which are given at pages 38—K. to 43—K. [of Vol. VII] will show many instances of greatly abnormal variations of refraction, such as are fatal to accuracy in the resulting determinations of height.

*Secondary Triangulation.*

The secondary triangulation accomplished in connection with this Series was mainly executed by the measurement—with the large theodolites—of the angles at the principal stations, to the surrounding secondary stations and other prominent objects, and by the measurement—with smaller theodolites—of the angles at the secondary stations which were required for combination with the former, in order to complete the secondary and minor triangles. The whole is shown in the chart accompanying the Synoptical Volume for this Series, in which volume all the requisite numerical details of angles and side-lengths, and of latitudes, longitudes, azimuths and heights, are given, both for the secondary stations and for the ‘intersected’ but unvisited points.

Most of the angles at the secondary stations were measured by Mr. Mulheran, who was specially commended for the vigour with which he succeeded in laying down the very large number of points between the parallels of  $25^{\circ}\frac{3}{4}$  and  $27^{\circ}\frac{1}{4}$  in a single field season, 1836-37.

*Compiled, with Addenda by the Surveyor General, by*

MUSSOOREE: }  
August 1881. }

C. WOOD,

*Surveyor 2nd Grade.*

---



# RANGIR MERIDIONAL SERIES.

1—K.

## ALPHABETICAL LIST OF STATIONS.

|                                                |        |                                                 |         |
|------------------------------------------------|--------|-------------------------------------------------|---------|
| Atária<br>(of North-East Longitudinal Series). | XI.    | Kalsán                                          | XIX     |
| Atsu                                           | XVI.   | Kanwa                                           | XII.    |
| Bhoraj                                         | IV.    | Kasrak                                          | XXVIII. |
| Birona                                         | XVIII. | Kusmár                                          | I.      |
| Bisungarh                                      | XX.    | Mamdábád                                        | XXII.   |
| Chandanpúr                                     | XXI.   | Manang                                          | VII.    |
| Chandla                                        | III.   | Máo                                             | XXIV.   |
| Dálípúr                                        | II.    | Nagonáth                                        | VIII.   |
| Datiára                                        | V.     | Nipenfa                                         | XIII.   |
| Dháka                                          | XXVI.  | Phára                                           | IX.     |
| Fateganj                                       | XXXI.  | Pothári                                         | XXIII.  |
| Gajnera                                        | XXX.   | Rangír<br>(of Calcutta Longitudinal Series).    | X.      |
| Gandaspúr                                      | XV.    | Saipúr                                          | XXVII.  |
| Gokalphára                                     | X.     | Seontára                                        | XVII.   |
| Gura                                           | XI.    | Sísgarh<br>(of North-East Longitudinal Series). | X.      |
| Guri                                           | XXV.   | Thanela                                         | VI.     |
| Husápúra                                       | XIV.   | Tinsmál<br>(of Calcutta Longitudinal Series).   | VII.    |
| Janjiri                                        | XXIX.  |                                                 |         |

## RANGIR MERIDIONAL SERIES.

## NUMERICAL LIST OF STATIONS.

|      |   |   |   |                                    |        |   |   |   |                                      |
|------|---|---|---|------------------------------------|--------|---|---|---|--------------------------------------|
| VII  | . | . | . | Tinsmál.                           | XVII   | . | . | . | Seontára.                            |
|      | . | . | . | (of Calcutta Longitudinal Series). |        | . | . | . |                                      |
| X    | . | . | . | Rangír.                            | XVIII  | . | . | . | Birona.                              |
|      | . | . | . | (of Calcutta Longitudinal Series). |        | . | . | . |                                      |
| I    | . | . | . | Kusmár.                            | XIX    | . | . | . | Kalsán.                              |
| II   | . | . | . | Dálípúr.                           | XX     | . | . | . | Bisungarh.                           |
| III  | . | . | . | Chandla.                           | XXI    | . | . | . | Chandanpúr.                          |
| IV   | . | . | . | Bhoraj.                            | XXII   | . | . | . | Mamdábád.                            |
| V    | . | . | . | Datiára.                           | XXIII  | . | . | . | Pothári.                             |
| VI   | . | . | . | Thanela.                           | XXIV   | . | . | . | Máo.                                 |
| VII  | . | . | . | Manang.                            | XXV    | . | . | . | Guri.                                |
| VIII | . | . | . | Nagonáth.                          | XXVI   | . | . | . | Dháka.                               |
| IX   | . | . | . | Phára.                             | XXVII  | . | . | . | Saipúr.                              |
| X    | . | . | . | Gokalphára.                        | XXVIII | . | . | . | Kasrak.                              |
| XI   | . | . | . | Gura.                              | XXIX   | . | . | . | Janjiri.                             |
| XII  | . | . | . | Kanwa.                             | XXX    | . | . | . | Gajnera.                             |
| XIII | . | . | . | Nipeníá.                           | XXXI   | . | . | . | Fateganj.                            |
| XIV  | . | . | . | Husápúra.                          | X      | . | . | . | Sísgarh.                             |
| XV   | . | . | . | Gandasapúr.                        |        | . | . | . | (of North-East Longitudinal Series). |
| XVI  | . | . | . | Atsu.                              | XI     | . | . | . | Atária.                              |
|      |   |   |   |                                    |        | . | . | . | (of North-East Longitudinal Series). |

## RANGIR MERIDIONAL SERIES.

## DESCRIPTION OF PRINCIPAL STATIONS.



Of the 31 Principal Stations composing this Series, the 10 southernmost are on hills, and are low solid platforms carrying a mark engraved either on the rock *in situ* or (presumably) on a stone imbedded at about the level of the ground: above this mark one or more other mark-stones, with the usual engraved circle and dot, are inserted in the platform, the uppermost being flush with the structure. When the Series entered the plains, artificial elevations had to be constructed. These special erections at the first 9 stations consisted of perforated columns of masonry of the following description;—*foundation* a foot or two in depth and having a mark-stone sunk flush with its surface; *plinth* either  $4\frac{1}{2}$  or  $5\frac{1}{2}$  feet square and  $3\frac{1}{2}$  feet high; *shaft* composed of two or more cylinders with diameters varying from 4 or 5 feet at base to 3 feet at summit; surmounted in nearly all instances with *capitals* 4 feet in diameter and about 3 feet in depth; an aperture about a foot across passed vertically through the column to admit of plumbing over the mark-stone to which access was obtained by means of a vaulted passage in the plinth. For the remainder of the Series the construction of these columns of masonry was slightly modified, and the structures, generally speaking, were built as follows;—*foundation* 3 feet in depth; *plinth* 9 feet square and 2 feet high having a mark-stone sunk flush with its surface; *basement* circular, 7 feet in diameter and 5 feet high; *shaft* starting in a curve from the edge of the basement and subsequently continued in the form of a truncated cone with a diameter of 3 feet at summit; surmounted with a *capital* and having an aperture as before described. For the accommodation of the observatory tent, temporary scaffolding platforms were erected around the columns: when the last 2 stations were subsequently visited in the course of the operations of the North-East Longitudinal Series, the columns were surrounded with a *kacha* tower about 14 feet in diameter at top. Exceptions to the general rules in point of construction of the towers will be found at the stations of Bisungarh and Muhammadabad, in the descriptions of which such details as are forthcoming have been embodied.

The following descriptions have been compiled from those given in the original MS. General Report and other original records of this Series, supplemented in respect to the neighboring villages by information obtained from the Revenue and Topographical Survey maps of the country traversed. The information as to the local sub-divisions in which the several stations occur has been derived where practicable from the latest Annual Reports received from the District officers to whose charge the stations have been committed.

VII.—(*Of the Calcutta Longitudinal Series*). Tinsmál Hill Station, lat.  $24^{\circ} 7'$ , long.  $79^{\circ} 2'$ —observed at in 1826, 1833, 1834 and 1864—is situated on the top of a very conspicuous hill about three-quarters of a

mile S. by E. of the village of Tinsua from which it is approached: thána, tahsíl and pargana Banda, district Saugor.

The pillar is solid and has three marks, one engraved on the rock *in situ* and the others at 3·5 and 8·5 feet above it respectively. The station of 1826 was revisited in 1833 for the purpose of originating the Budhon Meridional Series, when its height was increased by 8·5 feet. It was again visited in 1834 to originate the Rangir Meridional Series, but no further alteration in its construction appears to have been made. On visiting it in 1864, the upper mark being found displaced, a new mark was substituted in the normal of the lower mark. The distances and bearings of surrounding villages are:—Dalpatpur, from which a road leads up to the station, 1·5 miles N.E.; Lamnau 1·3 miles towards the W.; and the deserted village of Tinsi 0·8 mile S.S.E.

X.—(*Of the Calcutta Longitudinal Series*). Rangir Platform Station, lat.  $24^{\circ} 0'$ , long.  $79^{\circ} 28'$ —observed at in 1827, 1834 and 1864—is situated in a ploughed field about half a mile S.E. of the little village of Rangir: thána Narsingharh, tahsíl and district Damoh.

The pillar is solid and contains two marks, the upper being 5 feet above the lower. The station of 1827 was revisited in 1834 for the purpose of originating the Rangir Meridional Series, and was then raised 4 feet in height. On again visiting it in 1864 the station was found destroyed, and although a mark-stone was discovered amongst the debris it was impossible to say if this mark was in its original position. The new station established in 1864 is identical in height with the old station and it also agrees as closely in position with the latter, as this point could be conjectured. The distances and bearings of surrounding places are:—Narsingharh town  $2\frac{1}{4}$  miles W. by S.; Murhiya village 1·4 miles S.E.; and the town of Sítanagar 3·1 miles N.N.E.

I. Kusmár Hill Station, lat.  $24^{\circ} 15'$ , long.  $79^{\circ} 23'$ —observed at in 1826, 1834 and 1864—is situated on a low range of hills which extend from Panna towards Saugor, and is named after the village of Kusmár which lies at the foot of the hill at a distance of about a mile N. by W. of the station: pargana Baxwáho of the Panna state.

The station consists of a platform enclosing a central solid pillar of masonry 7·2 feet high which has a mark-stone at its upper surface, another at 2·9 feet below this, and a third at the level of the ground. The station of 1826 was revisited in 1834 in the course of the operations of the Rangir Meridional Series, and again in 1864 in the prosecution of the Calcutta Longitudinal Series, but no alteration in its construction appears to have been made on either of the two latter occasions. The distances and bearings of surrounding places are:—Hirapur iron mine about 11 miles towards the N.W.; Baxwáho town 3 miles W.; Machandri village 1·4 miles N.; and Semra village 1·5 miles S.S.W.

II. Dálípur (*Dálípur*) Hill Station, lat.  $24^{\circ} 27'$ , long.  $79^{\circ} 12'$ —observed at in 1834—is situated on the northern face of the Vindhyaçal range and is named after the small hill fort of Dálípur which stands at the base: pargana Bijáwar of the Bijáwar state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding places are:—Hirapur iron mine 6·6 miles S.E. by S.; Patera village 0·6 mile W. by S.; and Singhpur village 2·7 miles E.N.E.

III. Chandla Hill Station, lat.  $24^{\circ} 37'$ , long.  $79^{\circ} 30'$ —observed at in 1834—is situated on a hill so called, on the northern face of the Vindhyaçal range: pargana Bijáwar of the Bijáwar state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding places are:—Bijáwar town  $2\frac{1}{2}$  miles E.N.E.; Gulgauj town on high road from Saugor to Cawnpore 8 miles N.W. by N.; and the villages of Andiáro and Pokhrela at 3 miles and 2·5 miles to the S.S.W. and W. respectively.

IV. Bhoraj Hill Station, lat.  $24^{\circ} 50'$ , long.  $79^{\circ} 6'$ —observed at in 1834—is situated on a lofty range, on which stands a temple dedicated to the Hindu goddess Bhawáni: pargana Baldeogarh of the Orchha or Tehri state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface and a mark engraved on the rock *in situ*. The distances and bearings of surrounding villages are:—Serkunpur about 0·7 mile N. by E.; Dauhit-Singh-ka-pura 0·6 mile S.W.; and Khena 1·5 miles E.

V. Datiára Hill Station, lat.  $25^{\circ} 6'$ , long.  $79^{\circ} 25'$ —observed at in 1834—is situated on the highest point of a cluster of hills, along whose western base the Dhasán river winds: thána Ajnár, tahsíl and pargana Panwári, district Hamírpur.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface and a mark engraved on the rock *in situ*. The distances and bearings of surrounding villages are:—Narwara 0·5 mile N. by W.; Purainia 1·6 miles S.E. by S.; Daurea 1·7 miles E. by S.; and the town of Gerauli 2·1 miles S.W. by S.



VI. Thanela Hill Station, lat.  $24^{\circ} 58'$ , long.  $79^{\circ} 47'$ —observed at in 1834—is situated on a detached hill, at the foot of which lies the village of Sela: pargana Chhatarpur of the Chattarpur state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Mau 0·9 mile N.W.; Naddia 3·1 miles E. by S.; and Kotah 1·6 miles S.S.E.

VII. Manang Hill Station, lat.  $25^{\circ} 17'$ , long.  $79^{\circ} 46'$ —observed at in 1834—is situated on the summit of a hill so called, at the foot of which—and due south of the station—lies the village of Salat Malat: jagir Garhali which adjoins thána Kulpahár, tahsíl and pargana Panwári of the Hamírpur district.

The station consists of a circular paka platform, 16 feet in diameter, enclosing a central solid pillar of masonry which has a mark-stone at its upper surface and a mark engraved on the rock *in situ*. The distances and bearings of surrounding villages are:—Narari 1·8 miles S.E. by E.; Larpur 1·3 miles N.W. by N.; Kamálpur 1·5 miles W.; Supa 2·9 miles N.E.; and a Revenue Survey Bench-Mark fixed on a rock 1·04 chains S. by W.

VIII. Nágonáth (*Nagonáth*) Hill Station, lat.  $25^{\circ} 27'$ , long.  $79^{\circ} 23'$ —observed at in 1834 and 1836—is named after the Hindu deity Nágonáth whose temple stands on the same hill along the eastern side of which the river Dhasán winds: pargana Garotha, district Jhánsi.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of adjacent villages are:—Gura 1·1 miles S.W. by S.; and Karora about 1·2 miles N.W.

IX. Phára Hill Station, lat.  $25^{\circ} 41'$ , long.  $79^{\circ} 43'$ —observed at in 1834 and 1836—is situated on a hill, on which at the distance of a few yards S.S.E. of the station a temple—dedicated to the Hindu deity Mahádeo—is erected; it is named after the village of Phára or Pahra which lies at the foot of the hill and is due east of the station: thána Jariya, tahsíl and pargana Ráth, district Hamírpur.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Umaría 2 miles W. by N.; Jarmauli 1·6 miles N.N.W.; Turnan 2 miles E.S.E.; and Chilli 1·4 miles S.W.

X. Gokulphára (*Gokalphára*) Hill Station, lat.  $25^{\circ} 46'$ , long.  $79^{\circ} 20'$ —observed at in 1836—is situated on the highest of several eminences clustered in this vicinity, and is named after the small village of Gokulphára which lies at the western foot of the hill: in the Gursarai state within pargana Garotha of the Jhánsi district.

The station consists of a platform enclosing a central solid pillar of masonry 12 feet high: it has a mark-stone at its upper surface and a mark engraved on the rock *in situ*. The distances and bearings of surrounding villages are:—Gogul 0·6 mile N. by W.; Douri 2·6 miles W. by S.; Dhanora 2·1 miles S.S.E.; and Dhanori 2 miles E. by S.

XI. Gura Tower station, lat.  $25^{\circ} 58'$ , long.  $79^{\circ} 36'$ —observed at in 1837—is situated on a slight eminence and is named after the ruined village of Gura: thána Orá, tahsíl Kálpi, district Jálaun.

The station consists of a perforated masonry column  $5\frac{1}{2}$  feet square to a height of  $3\frac{1}{2}$  feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 33·3 feet above the mark-stone imbedded at the level of the ground and into which a brass plug with the mark engraved thereon has been countersunk. The distances and bearings of surrounding villages are:—Kurmir 1·8 miles N.N.W.; Burdar 1 mile E. by N.; Kurwi Buzurg 1·6 miles S.S.W.; and Dhani Buzurg 2·5 miles W.

XII. Kanwa Tower Station, lat.  $26^{\circ} 4'$ , long.  $79^{\circ} 19'$ —observed at in 1837—is situated on the terreplein and close to the N.W. tower of the fort of Kanwa distant about 6 miles S.W. by S. of the town and station of Jálaun: thána, tahsíl, pargana and district Jálaun.

The station consists of a perforated masonry column  $4\frac{1}{2}$  feet square to a height of  $3\frac{1}{2}$  feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 28·3 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Lachura 1·5 miles N.W.; Purwári 1·4 miles N.E.; Dunora 2·8 miles S.E.; and Bhair 2 miles W.S.W.

XIII. Nipania (*Nipenta*) Tower Station, lat.  $26^{\circ} 14'$ , long.  $79^{\circ} 38'$ —observed at in 1837—is situated on the right bank of the Jumna, and stands on the lands of the village of Pal Sarania at a distance of  $1\frac{1}{2}$  miles N. by W. of the village of Nipania: thána Nipania, tahsíl Kálpi, district Jálaun.

The station consists of a perforated masonry column  $5\frac{1}{2}$  feet square to a height of  $3\frac{1}{2}$  feet, and circular thereafter—the

diameter at top of shaft being 3 feet: the summit of the column is 39 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Simra Shaikhpur 1 mile E.S.E.; Sikunni 1.9 miles S.; and Sunni Ser 1.5 miles W. by N.

XIV. Husapura (*Husápúra*) Tower Station, lat.  $26^{\circ} 22'$ , long.  $79^{\circ} 21'$ —observed at in 1837—is situated in an open field due S. of the village of Husapura, and distant about  $2\frac{1}{2}$  miles from the right bank of the Jumna: thána Gohan, tahsíl Mádhogarh, district Jálaun.

The station consists of a perforated masonry column  $5\frac{1}{2}$  feet square to a height of  $3\frac{1}{2}$  feet, and circular thereafter—the diameter at top of shaft being 3 feet: the summit of the column is 33.8 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Pánipur 0.6 mile S.W.; Magtoa 1.1 miles due W.; Shaikhpur Ahir 0.5 mile E.; and Nímgau 1.3 miles S.E. by E.

XV. Gandaspur (*Gandaspur*) Tower Station, lat.  $26^{\circ} 28'$ , long.  $79^{\circ} 38'$ —observed at in 1837—is situated on a low mound which stands on the west side of the village of Gandaspur, and is distant about three-quarters of a mile from the right bank of the Sengar nadi: thána and pargana Derapur, district Cawnpore.

The station consists of a perforated masonry column  $4\frac{1}{2}$  feet square to a height of  $3\frac{1}{2}$  feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 28 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of neighboring villages are:—Napallapur 1.3 miles E.; and Mahásinghpur 0.8 mile S.E.

XVI. Atsu Tower Station, lat.  $26^{\circ} 35'$ , long.  $79^{\circ} 24'$ —observed at in 1837—is situated on the elevated platform which surrounds the exterior of the N.E. tower of the fort of Atsu or Arsu: taluka Bhareh, thána Ajítmal, tahsíl and pargana Auraiya, district Etáwah.

The station consists of a perforated masonry column  $4\frac{1}{2}$  feet square at base to a height of  $3\frac{1}{2}$  feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 25.7 feet above the mark-stone imbedded at the level of the platform. The distances and bearings of surrounding villages are:—Mahíuddín 0.6 mile S.; Durhaspur 1.6 miles W.; Alamgirpur 0.9 mile N.N.W.; and Rasúlpur 1 mile N.E. by N.

XVII. Seontára Tower Station, lat.  $26^{\circ} 42'$ , long.  $79^{\circ} 38'$ —observed at in 1837—is situated on the western solid tower of a small brick fort which is built on an extensive elevated mound (about 50 feet in height) down the eastern slope of which lies the village of Seontára, the western declivity being washed by the kind or Arind nadi: thána Bela, tahsíl and pargana Bidhúna, district Etáwah.

The station consists of a perforated masonry column  $4\frac{1}{2}$  feet square at base to a height of  $3\frac{1}{2}$  feet, and circular thereafter—the diameter at top of shaft being 4 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 16.8 feet above the mark-stone imbedded at the level of the tower. The distances and bearings of surrounding villages are:—Dunwama 1 mile W.N.W.; Rámpur 1.1 miles N.E.; Baryáramau 0.9 mile E.S.E.; and Ekghara 1.5 miles W.S.W.

XVIII. Birona Tower Station, lat.  $26^{\circ} 51'$ , long.  $79^{\circ} 25'$ —observed at in 1837 and 1840—is situated on the terreplein between the outer and inner walls of the fort in the village of Birona Kalán: thána Kudarkot, tahsíl and pargana Bidhúna, district Etáwah.

The station consists of a perforated masonry column  $4\frac{1}{2}$  feet square to a height of  $3\frac{1}{2}$  feet, and circular thereafter—the diameter at top of shaft being 3 feet: the summit of the column is 23.2 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Shaikhpur 1.6 miles N.W.; Morcha 1.3 miles N. by E.; Bulpur 2.4 miles S.E.; and Ujuluhr 1.6 miles S.S.W.

XIX. Kalsán Tower Station, lat.  $26^{\circ} 57'$ , long.  $79^{\circ} 41'$ —observed at in 1837 and 1840—is situated on the S.W. corner of an elevated mound in the village of Kalsán: pargana Tirwa, district Farrukhabad.

The station consists of a perforated masonry column  $4\frac{1}{2}$  feet square at base to a height of  $3\frac{1}{2}$  feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 23.1 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Mírpura 1.6 miles W.; Bagulhai 2.1 miles N.N.E.; Munkapur 2.7 miles E.; and Rámpur 1.3 miles S.

XX. Bisungarh Tower Station, lat.  $27^{\circ} 7'$ , long.  $79^{\circ} 27'$ —observed at in 1839 and 1841—is situated on a narrow mound to the south of the *bárádari* (summer-house) and outside the fort of Bisungarh or Binsia: pargana Chhibramau, district Farrukhabad.

The station consists of a perforated masonry column  $5\frac{1}{2}$  feet square to a height of 1 foot, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 24 feet above the

mark-stone which is imbedded at 1 foot above the level of the ground. The distances and bearings of surrounding villages are:—Surdamai 0·9 mile N. by E.; Astutabad 1·2 miles E.; and Shaikhpur 2·3 miles S.E.

XXI. Chandanpur (*Chandanpur*) Tower Station, lat.  $27^{\circ} 14'$ , long.  $79^{\circ} 41'$ —observed at in 1839 and 1841—is situated in an open field, and stands on the northern bank of a small tank at a distance of about 350 yards S.W. of the village of Chandanpur: pargana Bhojpur, district Farrukhabad.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The Ganges flows about 1 mile N.E. of the station, and the high road from Farrukhabad to Cawnpore passes within a mile to the west of it; the distances and bearings of surrounding villages are:—Rājīpur 0·6 mile W.; Singirāmpur 0·9 mile N.E.; and Mukrandnagar 0·8 mile S. by E.

XXII. Muhammadabad (*Mamdābād*) Tower Station, lat.  $27^{\circ} 18'$ , long.  $79^{\circ} 28'$ —observed at in 1841—is situated on the east bastion of the fort of Muhammadabad, and is distant about 400 yards W.S.W. of the town of that name: thāna and pargana Muhammadabad, district Farrukhabad.

The station consists of a tower of burnt bricks and mud cement 24 feet square at base and 18 feet square at top, enclosing a central isolated pier of masonry  $3\frac{1}{2}$  feet in diameter and 16·7 feet high—with a foundation of  $4\frac{1}{2}$  feet—which is marked in the usual manner. The high road from Agra to Fatehgarh passes about 600 yards E. of the station; and the distances and bearings of neighboring villages are:—Nandu Takīpur 0·7 mile S.W.; and Kabīrpur the same distance N.W. by N.

XXIII. Pothāri Tower Station, lat.  $27^{\circ} 23'$ , long.  $79^{\circ} 27'$ —observed at in 1838, 1839 and 1841—is situated on an elevated mound in the village of Pothāri: pargana Muhammadabad, district Farrukhabad.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·6 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:—Karanpur 0·6 mile E. by N.; Chandtokh 1·4 miles S.E.; Buruh 2 miles S.W.; and Pithua 2·1 miles W. by S.

XXIV. Mau (*Māo*) Tower Station, lat.  $27^{\circ} 30'$ , long.  $79^{\circ} 43'$ —observed at in 1838—is situated on a high mound in the village of Mau which lies on the left bank of the Rāmganga: pargana Imratpur, district Farrukhabad.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38·2 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:—Maulaganj 0·7 mile N.W.; Shāhjahānpur 1·1 miles E.; and Aligarh 0·9 mile S.S.W.

XXV. Guri Tower Station, lat.  $27^{\circ} 40'$ , long.  $79^{\circ} 29'$ —observed at in 1837 and 1838—is situated on a small mound in the village of Guri distant about 2 miles N. of the Ganges: pargana Meherabad, district Shāhjahānpur.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·9 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:—Usmānpur 0·4 mile S.W.; Lakhanpur 0·4 mile N. by E.; and Pitampur 1·7 miles S.E. by S.

XXVI. Dhāka Tower Station, lat.  $27^{\circ} 45'$ , long.  $79^{\circ} 43'$ —observed at in 1838—is situated on a low sandy elevation in an open field to the west of the village of Dhāka: pargana Meherabad, district Shāhjahānpur.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·7 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding places are:—Jalālabad town 2·2 miles S.S.W.; Malupur 0·9 mile W.; Juguah 0·9 mile N.E. by N.; and Gularia 0·8 mile S.S.E.

XXVII. Saipur (*Saipur*) Tower Station, lat.  $27^{\circ} 55'$ , long.  $79^{\circ} 27'$ —observed at in 1838—is situated on an elevated mound said to be the site of the ancient village of Saipur: thāna and pargana Hazratpur, tahsīl Dātaganj, district Budaun.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages

are:—Chungosi 0·9 mile N.W.; Chithri 0·8 mile S.E.; Sikutia about 1 mile S.W.; and Garhia 1·6 miles E.

XXVIII. Kasrak Tower Station, lat.  $28^{\circ} 3'$ , long.  $79^{\circ} 42'$ —observed at in 1838—is situated on the crest of an elevated mound 600 yards south of the village of Kasrak: pargana Mírānpur Katra, district Shāh-jahānpur.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The high road from Farrukhabad to Bareilly passes about half a mile west of the station; and the distances and bearings of surrounding places are:—the town of Mírānpur Katra 1·6 miles S.; Kusak village 1·2 miles N. by W.; and Sahupur 0·5 mile N.E.

XXIX. Janjiri Tower Station, lat.  $28^{\circ} 11'$ , long.  $79^{\circ} 27'$ —observed at in 1838—is situated on a mound in the village of Janjiri, and is distant 2 miles from the right bank of the Rāmganga: pargana Ballia, district Bareilly.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·8 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:—Kiratpur 0·6 mile W. by N.; Turkuni 1·2 miles N.E.; and Himpatpur Behāripur 0·8 mile E.

XXX. Gajnera Tower Station, lat.  $28^{\circ} 20'$ , long.  $79^{\circ} 41'$ —observed at in 1838 and 1839—is situated on a mound about 350 yards south of the village of Gajnera the eastern extremity of which is washed by the Kailās nadi: pargana Farīdpur, district Bareilly.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding places are:—the town of Bhuta 2·2 miles W.; Suraur village 1·4 miles N.N.E.; and Khurduha 0·8 mile S.E.

XXXI. Fatehganj (*Fateganj*) Tower Station, lat.  $28^{\circ} 27'$ , long.  $79^{\circ} 21'$ —observed at in 1838 and 1839—is situated on a mound distant about 500 yards S.E. of the town of Fatehganj on the high road from Bareilly to Moradabad; this locality is memorable in the annals of Rohilkhand as the scene of the last struggle made (in 1794) by the Pathāns under their leader Najū Khān against the power of the British: pargana Karor, district Bareilly.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·9 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. In a large enclosure about 200 yards E. of the station are the tombs of the Pathāns who fell in the struggle, and a cenotaph erected on the spot by order of Government commemorates their heroism; the mausoleum of their brave leader stands at about 40 yards from the station: the distances and bearings of surrounding villages are:—Unāsi 0·9 mile W.; Ballia 2·5 miles E.; and Rukumpur 1·3 miles S.E.

X.—(*Of the North-East Longitudinal Series*). Sísgarh Tower Station, lat.  $28^{\circ} 44'$ , long.  $79^{\circ} 21'$ —observed at in 1839 and 1851—is situated on a platform in the centre of the fort which stands on a mound raised considerably above the general level of the surrounding country, and immediately south of the large village of Sísgarh: pargana Sīrsāwān, district Bareilly.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central perforated pillar of masonry whose summit is 38·0 feet above the mark-stone which \* is 2 feet higher than the level of the ground. The station of 1839 was a column standing 38·3 feet above the mark-stone and similar in construction to the stations which precede; it was found, when revisited in the course of the operations of the North-East Longitudinal Series, to be so deflected as to necessitate the dismantling of a considerable portion of it; it was then rebuilt to its present height and enclosed in a *kacha* tower—the upper 5 feet of it being isolated therefrom: at the same time a second mark 1·8 inches N.W. by W. of the former one was cut on the original mark-stone. The road from Bareilly to Almora passes by the station; and the distances and bearings of surrounding villages are:—Ghulāmganj 1·4 miles W.; Tigri 1·4 miles E.N.E.; and Girdhārpur 0·6 mile S.

XI.—(*Of the North-East Longitudinal Series*). Atária Tower Station, lat.  $28^{\circ} 38'$ , long.  $79^{\circ} 38'$ —observed at in 1839, 1843 and 1851—is situated on a mound near the east bank of the Baigul nadi, and distant about half a mile S.W. of the village of Atária: pargana Richha, district Bareilly.

The station consists of a tower of unburnt bricks and mud cement, about 14 feet in diameter at top, enclosing a central

\* In the description of this station given in the North-East Longitudinal Series p. 7—*I*, the height of this mark-stone above ground level is stated at 0 feet as erroneously entered in the field records of that series.

perforated pillar of masonry whose summit is 37·8 feet above the mark-stone which\* is 2 feet higher than the level of the ground. The station of 1839 was a column 37·3 feet above the mark-stone and similar in manner of construction to the stations which precede; it was found greatly deflected when the observations on the Rangir Series came to be made so that the mark-stone in the basement could not be plumbed from the summit of the tower; the point of observation was indicated by the intersection of the diagonals of a quadrilateral each angular point of which was denoted by a dot engraved on an iron bolt imbedded in an external masonry pillar built in the adjacent fields. When the station was revisited in 1843 in the course of the operations of the North Connecting Series, the pillar was found still further deflected, and no trace of the four external pillars was forthcoming; the instrument was accordingly plumbed over a mark engraved on a new mark-stone let into the basement. On again visiting the station in 1851 in the course of the operations of the North-East Longitudinal Series, it was found necessary to dismantle a considerable portion of the pillar, which was then rebuilt to its present height and enclosed in a *kacha* tower: at the same time a second mark 3·5 inches W.N.W. of the mark of 1843 was engraved on the mark-stone of that year. The distances and bearings of surrounding villages are:—Ináyatpur 0·9 mile N.E.; Sayyidpur 1·2 miles E.; Uturnia Mádhapur 0·5 mile S.S.W.; and Jumunián 0·8 mile N.W.

---

\* In the description of this station given in the North-East Longitudinal Series p. 7—*I*, the height of this mark-stone above ground level is stated at 0 feet as erroneously entered in the field records of that series.

July 1877.

J. B. N. HENNESSEY,

*In charge of Computing Office.*

## RANGIR MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. TRIANGLES.

| No. of Triangle | Station      | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|--------------|------------------|-----------------------|-----------|----------|--------|
|                 |              |                  |                       | Log. feet | Feet     | Miles  |
| 1               | Tinsmál, VII | "                | °   '   "             |           |          |        |
|                 | Rangir, X    | .90              | 37 36 19.43           | 4.9667210 | 92623.5  | 17.542 |
|                 | Kusmár, I    | .90              | 54 24 15.62           | 5.0914027 | 123424.9 | 23.376 |
| 2               | Tinsmál, VII | .90              | 87 59 24.95           | 5.1809676 | 151693.7 | 28.730 |
|                 | Kusmár, I    | .89              | 44 20 35.26           | 4.9830826 | 96179.5  | 18.216 |
|                 | Dálípur, II  | .90              | 71 53 48.36           | 5.1165854 | 130793.3 | 24.771 |
| 3               | Kusmár, I    | .89              | 63 45 36.38           | 5.0914027 | 123424.9 | 23.376 |
|                 | Dálípur, II  | .86              | 55 51 12.69           | 5.0620943 | 115370.4 | 21.850 |
|                 | Chandla, III | .87              | 80 31 15.94           | 5.1383004 | 137499.3 | 26.042 |
| 4               | Dálípur, II  | .86              | 43 37 31.37           | 4.9830826 | 96179.5  | 18.216 |
|                 | Chandla, III | 1.28             | 73 16 38.22           | 5.1995153 | 158312.6 | 29.983 |
|                 | Bhoraj, IV   | 1.28             | 62 27 41.37           | 5.1660588 | 146574.6 | 27.760 |
| 5               | Chandla, III | 1.27             | 44 15 40.41           | 5.0620943 | 115370.4 | 21.850 |
|                 | Bhoraj, IV   | 1.72             | 49 14 58.45           | 5.1575789 | 143740.4 | 27.224 |
|                 | Datiára, V   | 1.73             | 74 12 4.19            | 5.2614378 | 182573.5 | 34.578 |
|                 |              | 1.73             | 56 32 57.36           | 5.1995153 | 158312.6 | 29.983 |

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Stations Tinsmál, VII, and Rangir, X appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

## PRINCIPAL TRIANGULATION. TRIANGLES.

11\_K.

| No. of Triangle | Station        | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|----------------|------------------|-----------------------|-----------|----------|--------|
|                 |                |                  |                       | Log. feet | Feet     | Miles  |
| 6               | Chandla, III   | 1'67             | 45 37 4'34            | 5'1302726 | 134981'0 | 25'565 |
|                 | Datiára, V     | 1'67             | 59 12 50'20           | 5'2101903 | 162252'1 | 30'730 |
|                 | Thanela, VI    | 1'67             | 75 10 5'46            | 5'2614378 | 182573'5 | 34'578 |
| 7               | Datiára, V     | 1'12             | 52 50 21'48           | 5'0756724 | 119034'4 | 22'544 |
|                 | Thanela, VI    | 1'12             | 62 30 38'94           | 5'1222160 | 132500'0 | 25'095 |
|                 | Manang, VII    | 1'13             | 64 38 59'58           | 5'1302726 | 134981'0 | 25'565 |
| 8               | Datiára, V     | 1'19             | 64 59 46'94           | 5'1413570 | 138470'4 | 26'225 |
|                 | Manang, VII    | 1'18             | 54 52 5'33            | 5'0967571 | 124956'0 | 23'666 |
|                 | Nágonáth, VIII | 1'18             | 60 8 7'73             | 5'1222160 | 132500'0 | 25'095 |
| 9               | Manang, VII    | 1'36             | 59 42 20'81           | 5'1482905 | 140698'8 | 26'648 |
|                 | Nágonáth, VIII | 1'36             | 62 6 26'85            | 5'1584222 | 144019'8 | 27'276 |
|                 | Phára, IX      | 1'35             | 58 11 12'34           | 5'1413570 | 138470'4 | 26'225 |
| 10              | Nágonáth, VIII | 1'10             | 60 8 12'15            | 5'1134245 | 129844'8 | 24'592 |
|                 | Phára, IX      | 1'10             | 49 51 38'08           | 5'0586622 | 114462'2 | 21'678 |
|                 | Gokulphára, X  | 1'11             | 70 0 9'77             | 5'1482905 | 140698'8 | 26'648 |
| 11              | Phára, IX      | '92              | 57 38 8'55            | 5'0640037 | 115878'7 | 21'947 |
|                 | Gokulphára, X  | '92              | 51 11 50'56           | 5'0290307 | 106913'0 | 20'249 |
|                 | Gura, XI       | '93              | 71 10 0'89            | 5'1134245 | 129844'8 | 24'592 |
| 12              | Gokulphára, X  | '82              | 53 8 37'10            | 5'0090505 | 102105'8 | 19'338 |
|                 | Gura, XI       | '82              | 61 36 58'17           | 5'0502590 | 112268'8 | 21'263 |
|                 | Kanwa, XII     | '82              | 65 14 24'73           | 5'0640037 | 115878'7 | 21'947 |
| 13              | Gura, XI       | '74              | 72 58 44'57           | 5'0721535 | 118073'8 | 22'362 |
|                 | Kanwa, XII     | '74              | 51 14 27'45           | 4'9835810 | 96290'0  | 18'237 |
|                 | Nipania, XIII  | '74              | 55 46 47'98           | 5'0090505 | 102105'8 | 19'338 |
| 14              | Kanwa, XII     | '80              | 53 40 13'44           | 5'0095020 | 102212'0 | 19'358 |
|                 | Nipania, XIII  | '80              | 57 47 39'64           | 5'0308130 | 107352'7 | 20'332 |
|                 | Husapura, XIV  | '81              | 68 32 6'92            | 5'0721535 | 118073'8 | 22'362 |
| 15              | Nipania, XIII  | '65              | 62 33 50'16           | 5'0028778 | 100664'8 | 19'065 |
|                 | Husapura, XIV  | '65              | 53 7 27'32            | 4'9577537 | 90730'6  | 17'184 |
|                 | Gandaspur, XV  | '65              | 64 18 42'52           | 5'0095020 | 102212'0 | 19'358 |
| 16              | Husapura, XIV  | '56              | 57 49 39'67           | 4'9550640 | 90170'4  | 17'078 |
|                 | Gandaspur, XV  | '56              | 51 16 10'60           | 4'9196119 | 83102'1  | 15'739 |
|                 | Atsu, XVI      | '56              | 70 54 9'73            | 5'0028778 | 100664'8 | 19'065 |
| 17              | Gandaspur, XV  | '53              | 61 21 24'19           | 4'9506117 | 89250'7  | 16'904 |
|                 | Atsu, XVI      | '52              | 56 11 10'36           | 4'9268275 | 84494'3  | 16'003 |
|                 | Seontára, XVII | '53              | 62 27 25'45           | 4'9550640 | 90170'4  | 17'078 |
| 18              | Atsu, XVI      | '57              | 58 5 49'04            | 4'9537074 | 89889'2  | 17'024 |
|                 | Seontára, XVII | '57              | 64 27 14'19           | 4'9801501 | 95532'3  | 18'093 |
|                 | Birona, XVIII  | '57              | 57 26 56'77           | 4'9506117 | 89250'7  | 16'904 |
| 19              | Seontára, XVII | '59              | 65 16 18'08           | 4'9891122 | 97524'2  | 18'470 |
|                 | Birona, XVIII  | '59              | 57 53 0'58            | 4'9587495 | 90938'9  | 17'223 |
|                 | Kalsán, XIX    | '58              | 56 50 41'34           | 4'9537074 | 89889'2  | 17'024 |
| 20              | Birona, XVIII  | '62              | 58 33 56'52           | 4'9737188 | 94128'0  | 17'827 |
|                 | Kalsán, XIX    | '62              | 59 18 9'59            | 4'9770840 | 94860'2  | 17'966 |
|                 | Bisungarh, XX  | '63              | 62 7 53'89            | 4'9891122 | 97524'2  | 18'470 |

| No. of Triangle | Station            | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|--------------------|------------------|-----------------------|-----------|----------|--------|
|                 |                    |                  |                       | Log. feet | Feet     | Miles  |
| 21              | Kalsán, XIX        | 59               | 54 11 22'35           | 4'9456218 | 88231'1  | 16'710 |
|                 | Bisungarh, XX      | 60               | 65 54 35'52           | 4'9970493 | 99322'9  | 18'811 |
|                 | Chandanpur, XXI    | 60               | 59 54 2'13            | 4'9737188 | 94128'0  | 17'827 |
| 22              | Bisungarh, XX      | 42               | 57 15 4'68            | 4'8929037 | 78145'5  | 14'800 |
|                 | Chandanpur, XXI    | 42               | 51 1 0'74             | 4'8586874 | 72225'0  | 13'679 |
|                 | Muhammadabad, XXII | 43               | 71 43 54'58           | 4'9456218 | 88231'1  | 16'710 |
| 23              | Chandanpur, XXI    | 16               | 15 31 41'51           | 4'4743603 | 29809'9  | 5'646  |
|                 | Muhammadabad, XXII | 16               | 119 54 1'32           | 4'9846574 | 96528'9  | 18'282 |
|                 | Pothári, XXIII     | 16               | 44 34 17'17           | 4'8929037 | 78145'5  | 14'800 |
| 24              | Bisungarh, XX      | 03               | 3 23 29'59            | 4'4743605 | 29809'9  | 5'646  |
|                 | Muhammadabad, XXII | 04               | 168 22 3'47           | 5'0068961 | 101600'6 | 19'243 |
|                 | Pothári, XXIII     | 03               | 8 14 26'94            | 4'8586874 | 72225'0  | 13'679 |
| 25              | Chandanpur, XXI    | 63               | 56 33 48'46           | 4'9699196 | 93308'2  | 17'672 |
|                 | Pothári, XXIII     | 64               | 63 44 50'06           | 5'0012155 | 100280'3 | 18'992 |
|                 | Mau, XXIV          | 64               | 59 41 21'48           | 4'9846574 | 96528'9  | 18'282 |
| 26              | Pothári, XXIII     | 65               | 59 36 30'78           | 4'9876364 | 97193'3  | 18'408 |
|                 | Mau, XXIV          | 65               | 64 29 11'49           | 5'0072719 | 101688'5 | 19'259 |
|                 | Guri, XXV          | 64               | 55 54 17'73           | 4'9699196 | 93308'2  | 17'672 |
| 27              | Mau, XXIV          | 55               | 53 37 20'37           | 4'9284610 | 84812'7  | 16'063 |
|                 | Guri, XXV          | 56               | 59 3 37'91            | 4'9559387 | 90352'2  | 17'112 |
|                 | Dháka, XXVI        | 56               | 67 19 1'72            | 4'9876364 | 97193'3  | 18'408 |
| 28              | Guri, XXV          | 59               | 74 42 22'44           | 5'0288749 | 106874'7 | 20'241 |
|                 | Dháka, XXVI        | 59               | 55 20 42'35           | 4'9597183 | 91141'9  | 17'262 |
|                 | Saipur, XXVII      | 58               | 49 56 55'21           | 4'9284610 | 84812'7  | 16'063 |
| 29              | Dháka, XXVI        | 74               | 51 57 55'46           | 4'9816288 | 95858'1  | 18'155 |
|                 | Saipur, XXVII      | 74               | 66 36 48'60           | 5'0480725 | 111705'0 | 21'156 |
|                 | Kasrak, XXVIII     | 74               | 61 25 15'94           | 5'0288749 | 106874'7 | 20'241 |
| 30              | Saipur, XXVII      | 62               | 59 5 50'17            | 4'9765174 | 94736'5  | 17'943 |
|                 | Kasrak, XXVIII     | 63               | 60 39 9'91            | 4'9833595 | 96240'9  | 18'227 |
|                 | Janjiri, XXIX      | 62               | 60 14 59'92           | 4'9816288 | 95858'1  | 18'155 |
| 31              | Kasrak, XXVIII     | 63               | 57 34 5'22            | 4'9753600 | 94484'4  | 17'895 |
|                 | Janjiri, XXIX      | 64               | 64 37 20'37           | 5'0049315 | 101142'0 | 19'156 |
|                 | Gajnera, XXX       | 64               | 57 48 34'41           | 4'9765174 | 94736'5  | 17'943 |
| 32              | Janjiri, XXIX      | 74               | 70 35 32'13           | 5'0630680 | 115629'3 | 21'899 |
|                 | Gajnera, XXX       | 74               | 58 59 27'31           | 5'0214986 | 105074'8 | 19'901 |
|                 | Fatehganj, XXXI    | 73               | 50 25 0'56            | 4'9753600 | 94484'4  | 17'895 |
| 33              | Gajnera, XXX       | 85               | 57 55 52'00           | 5'0410910 | 109923'6 | 20'819 |
|                 | Fatehganj, XXXI    | 86               | 59 1 10'84            | 5'0461524 | 111212'2 | 21'063 |
|                 | Atária, XI         | 86               | 63 2 57'16            | 5'0630680 | 115629'3 | 21'899 |
| 34              | Fatehganj, XXXI    | 68               | 53 17 53'32           | 4'9723578 | 93833'5  | 17'771 |
|                 | Atária, XI         | 68               | 56 46 40'45           | 4'9908090 | 97905'9  | 18'543 |
|                 | Sísagarh, X        | 68               | 69 55 26'23           | 5'0410910 | 109923'6 | 20'819 |

NOTE.—Stations Sísagarh, X, and Atária, XI appertain to the North-East Longitudinal Series.

March 1879.

J. B. N. HENNESSEY,

In charge of Computing Office.



# RANGIR MERIDIONAL SERIES.

## SECONDARY TRIANGULATION. TRIANGLES.

### PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

| No. of Triangle | Station                                           | Corrected Plane Angle         | Distance                         |                           |                            | No. of Triangle used | Station                                 | Corrected Plane Angle                   | Distance                         |                         |                           | Theodolite used |
|-----------------|---------------------------------------------------|-------------------------------|----------------------------------|---------------------------|----------------------------|----------------------|-----------------------------------------|-----------------------------------------|----------------------------------|-------------------------|---------------------------|-----------------|
|                 |                                                   |                               | Log. feet                        | Feet                      | Miles                      |                      |                                         |                                         | Log. feet                        | Feet                    | Miles                     |                 |
| 35              | Tinsmál, VII<br>Patharia<br>Katara Tiled Building | 91 52 8<br>12 37 46<br>h.s.   | 5°015242<br>4°352212<br>5°001418 | 103572<br>22658<br>100327 | 19°616<br>4°291<br>19°001  | Inch<br>18<br>"      | Kusmár, I<br>Baksua<br>Baksua Fort      | 17 46 54<br>79 51 33<br>h.s.            | 3°764463<br>4°272769<br>4°275734 | 5814<br>18740<br>18868  | 1°101<br>3°549<br>3°574   | Inch<br>18<br>† |
| 36              | Tinsmál, VII<br>Kusmár, I<br>Niwar Tiled Building | 24 49 40<br>13 27 39<br>h.s.  | 4°922413<br>4°666222<br>5°091403 | 83640<br>46368<br>123425  | 15°841<br>8°782<br>23°376  | "<br>"<br>"          | Kusmár, I<br>Baksua<br>Baksua Temple    | 18 28 58<br>66 10 12<br>h.s.            | 3°778714<br>4°238930<br>4°275734 | 6008<br>17335<br>18868  | 1°138<br>3°283<br>3°574   | 18<br>†         |
| 37              | Kusmár, I<br>Dálpur, II<br>Baksua                 | 60 40 40<br>10 42 54<br>h.s.  | 4°946855<br>4°275734<br>4°963083 | 88482<br>18868<br>96180   | 16°758<br>3°574<br>18°216  | "<br>"<br>"          | Kusmár, I<br>Baksua<br>Mangrai Building | 20 55 48<br>115 32 26<br>h.s.           | 3°990631<br>4°393028<br>4°275734 | 9787<br>24719<br>18868  | 1°854<br>4°682<br>3°574   | 18<br>†         |
| 38              | Kusmár, I<br>Baksua<br>Senra Fort                 | 42 38 1<br>14 37 47<br>h.s.   | 4°181639<br>3°753237<br>4°275734 | 15193<br>5665<br>18868    | 2°877<br>1°073<br>3°574    | 18<br>†              | Rangr, X<br>Kusmár, I<br>Bia Barari     | 26 24 40<br>71 3 59<br>82 31 21<br>h.s. | 4°618603<br>4°946273<br>4°966721 | 41553<br>88364<br>92623 | 7°870<br>16°736<br>17°542 | 18<br>"†        |
| 39              | Tinsmál, VII<br>Kusmár, I<br>Bakarua              | 21 17 27<br>140 25 34<br>h.s. | 4°783744<br>4°847242<br>5°091403 | 60778<br>70346<br>123425  | 11°511<br>13°323<br>23°376 | 18<br>†              | Kusmár, I<br>Dálpur, II<br>Hardua Tree  | 12 3 42<br>16 49 18<br>h.s.             | 4°619183<br>4°760600<br>4°983083 | 41609<br>57624<br>96180 | 7°880<br>10°914<br>18°216 | 18<br>"         |

NOTES.—1. Names followed by Roman numerals are those of Principal Stations. Station Tinsmál, VII appertains to the Calcutta Longitudinal Series of the South-East Quadrilateral.  
2. The values of the sides are given in the same line with the opposite angle. † Instrument not known.

| No. of Triangle | Station                                | Corrected Plane Angle | Distance                                                                               |                          |                            | No. of Triangle | Station                                            | Corrected Plane Angle                | Distance                                     |                            |                            | Theodolite used |
|-----------------|----------------------------------------|-----------------------|----------------------------------------------------------------------------------------|--------------------------|----------------------------|-----------------|----------------------------------------------------|--------------------------------------|----------------------------------------------|----------------------------|----------------------------|-----------------|
|                 |                                        |                       | Log. feet                                                                              | Feet                     | Miles                      |                 |                                                    |                                      | Log. feet                                    | Feet                       | Miles                      |                 |
| 45              | Kusmár, I<br>Bakarua<br>Hardua Tree    | h.s.                  | 4° 59' 32.02<br>4° 70' 06.00<br>4° 78' 37.44                                           | 39192<br>57624<br>60778  | 7.423<br>10.914<br>11.511  | 58              | Dálipur, II<br>Chandla, III<br>Dhasán River Temple | 41° 30' 54<br>59° 29' 18             | 4° 89' 15.46<br>5° 00' 54.21<br>5° 06' 20.94 | 77901<br>101256<br>115370  | 14.754<br>19.177<br>21.850 | 18<br>" "       |
| 46              | Dálipur, II<br>Hardua Tree<br>Hasri    | h.s.                  | 57° 33' 22<br>4° 34' 06.15<br>4° 30' 89.14<br>4° 01' 19.18                             | 35169<br>20366<br>41009  | 6.661<br>3.857<br>7.880    | 59              | Chandla, III<br>Datiára, V<br>Chhatarpur Temple    | 29° 23' 9<br>34° 36' 24              | 4° 99' 06.11<br>5° 06' 21.07<br>5° 26' 14.38 | 99681<br>115374<br>182574  | 18.879<br>21.851<br>34.578 | " "             |
| 47              | Dálipur, II<br>Hasri<br>Shágharh Fort  | h.s.                  | 24° 41' 13<br>144° 50' 35<br>4° 07' 03.33<br>4° 80' 97.95<br>4° 30' 89.14              | 46809<br>64535<br>20366  | 8.865<br>12.223<br>3.857   | 60              | Datiára, V<br>Thandla, VI<br>Chhatarpur Temple     | 24° 36' 28<br>43° 6' 6               | 4° 78' 35.18<br>4° 99' 06.11<br>5° 13' 02.73 | 60746<br>99681<br>134981   | 11.505<br>18.879<br>25.565 | " "             |
| 48              | Dálipur, II<br>Hasri<br>Bannora Fort   | h.s.                  | 40° 0' 4<br>48° 37' 44<br>4° 11' 17.16<br>4° 18' 43.57<br>4° 30' 89.14                 | 13905<br>15288<br>20366  | 2.480<br>2.895<br>3.857    | 61              | Chandla, III<br>Chhatarpur Temple<br>Bánsparh      | 65° 50' 46<br>64° 27' 25             | 5° 06' 09.84<br>4° 98' 09.91<br>5° 06' 21.07 | 116677<br>97519<br>115374  | 22.098<br>18.470<br>21.851 | " +             |
| 49              | Dálipur, II<br>Chandla, III<br>Bila    | h.s.                  | 24° 49' 9<br>34° 29' 40<br>120° 41' 11<br>4° 75' 06.06<br>4° 88' 06.76<br>5° 06' 20.94 | 56313<br>75976<br>115370 | 10.665<br>14.389<br>21.850 | 62              | Chandla, III<br>Thandla, VI<br>Bánsparh            | 49° 36' 40<br>36° 51' 46             | 5° 09' 27.92<br>4° 98' 09.91<br>5° 21' 01.90 | 123820<br>97519<br>162252  | 23.451<br>18.470<br>30.730 | 18 "            |
| 50              | Kusmár, I<br>Dálipur, II<br>Bila       | h.s.                  | 49° 37' 35<br>55° 42' 8<br>74° 40' 17<br>4° 88' 06.76<br>4° 91' 58.57<br>4° 98' 30.83  | 75976<br>82387<br>96180  | 14.389<br>15.604<br>18.216 | 63              | Chandla, III<br>Bánsparh<br>Sánra                  | 46° 44' 54<br>66° 1' 17              | 4° 88' 06.69<br>4° 98' 51.31<br>4° 98' 09.91 | 77032<br>96634<br>97519    | 14.589<br>18.302<br>18.470 | " +             |
| 51              | Kusmár, I<br>Bila<br>Gadakhár          | h.s.                  | 48° 58' 54<br>39° 42' 35<br>91° 18' 31<br>4° 79' 36.29<br>4° 72' 14.02<br>4° 91' 58.57 | 62177<br>52650<br>82387  | 11.776<br>9.972<br>15.604  | 64              | Bánsparh<br>Sánra<br>Sonha                         | 31° 6' 20<br>90° 59' 55              | 4° 81' 46.61<br>4° 59' 09.03<br>4° 88' 06.69 | 65262<br>39802<br>77032    | 12.360<br>7.538<br>14.589  | + +             |
| 52              | Kusmár, I<br>Bila<br>Bádsháhpur        | h.s.                  | 50° 54' 36<br>72° 45' 10<br>4° 88' 55.19<br>4° 97' 58.90<br>4° 91' 58.57               | 76828<br>94534<br>82387  | 14.551<br>17.904<br>15.604 | 65              | Bánsparh<br>Sonha<br>Tálgaon Hill Mark             | 45° 12' 32<br>116° 7' 5              | 4° 94' 55.89<br>5° 04' 77.49<br>4° 59' 09.03 | 88224<br>111022<br>39802   | 16.709<br>21.140<br>7.538  | + +             |
| 53              | Chandla, III<br>Bila<br>Gopálpur       | h.s.                  | 27° 25' 26<br>102° 42' 58<br>4° 53' 05.10<br>4° 85' 64.60<br>4° 75' 06.06              | 33927<br>71855<br>56313  | 6.425<br>13.609<br>10.665  | 66              | Thandla, VI<br>Bánsparh<br>Managárh                | 34° 6' 37<br>61° 45' 48<br>84° 7' 35 | 4° 84' 38.76<br>5° 04' 00.54<br>5° 09' 27.92 | 60803<br>109661<br>123820  | 13.220<br>20.769<br>23.451 | 18              |
| 54              | Dálipur, II<br>Chandla, III<br>Pola    | h.s.                  | 24° 10' 23<br>38° 47' 12<br>4° 72' 46.17<br>4° 90' 92.36<br>5° 06' 20.94               | 53042<br>81140<br>115370 | 10.046<br>15.367<br>21.850 | 67              | Chandla, III<br>Thandla, VI<br>Managárh            | 39° 20' 7<br>70° 58' 23              | 5° 04' 09.54<br>5° 21' 36.62<br>5° 21' 01.90 | 109661<br>163554<br>162252 | 20.769<br>30.976<br>30.730 | " "             |
| 55              | Kusmár, I<br>Dálipur, II<br>Pola       | h.s.                  | 52° 49' 40<br>56° 20' 54<br>4° 90' 92.36<br>4° 92' 82.18<br>4° 98' 30.83               | 81140<br>84765<br>96180  | 15.367<br>16.054<br>18.216 | 68              | Chandla, III<br>Chhatarpur Temple<br>Nagron        | 15° 3' 51<br>156° 52' 37             | 4° 88' 28.46<br>4° 61' 47.58<br>5° 06' 21.07 | 76356<br>41187<br>115374   | 14.461<br>7.801<br>21.851  | " +             |
| 56              | Dálipur, II<br>Bila<br>Sempa Temple    | h.s.                  | 39° 57' 33<br>36° 26' 23<br>4° 70' 07.58<br>4° 66' 67.99<br>4° 88' 06.76               | 50303<br>46430<br>75976  | 9.508<br>8.794<br>14.389   | 69              | Chandla, III<br>Dhasán River Temple<br>Nagroa      | 66° 32' 43<br>81° 53' 34             | 4° 85' 84.55<br>4° 61' 47.58<br>4° 89' 15.46 | 72186<br>41187<br>77901    | 13.672<br>7.801<br>14.754  | 18 +            |
| 57              | Dálipur, II<br>Bila<br>Khatoli Gateway | h.s.                  | 26° 35' 9<br>86° 24' 9<br>4° 56' 74.42<br>4° 91' 57.56<br>4° 88' 06.76                 | 36935<br>82307<br>75976  | 6.995<br>15.600<br>14.389  | 70              | Chandla, III<br>Nagroa<br>Bijáwar Temple           | 54° 30' 29<br>20° 29' 32             | 4° 54' 05.44<br>4° 17' 39.82<br>4° 61' 47.58 | 34717<br>14927<br>41187    | 6.575<br>2.827<br>7.801    | 18 +            |

† Instrument not known.

| No. of Triangle | Station                                     | Corrected Plane Angle                    | Distance                         |                            |                            | No. of Triangle | Station                                             | Corrected Plane Angle         | Distance                         |                           |                            | Theodolite used | Inch |
|-----------------|---------------------------------------------|------------------------------------------|----------------------------------|----------------------------|----------------------------|-----------------|-----------------------------------------------------|-------------------------------|----------------------------------|---------------------------|----------------------------|-----------------|------|
|                 |                                             |                                          | Log. feet                        | Feet                       | Miles                      |                 |                                                     |                               | Log. feet                        | Feet                      | Miles                      |                 |      |
| 71              | Chandla, III<br>Nagroa<br>Bijawar Palace    | h.s.<br>61 9 11<br>19 43 54              | 4 362738<br>4 148700<br>4 614758 | 36537<br>14083<br>41187    | 6.920<br>2.667<br>7.801    | 18              | Putli Bakoára<br>Gara Sandna<br>Pai Temple          | h.s.<br>52 59 45<br>48 4 10   | 4 605709<br>4 574931<br>4 695235 | 40338<br>37578<br>49572   | 7.640<br>7.117<br>9.389    | †               | †    |
| 72              | Chandla, III<br>Nagroa<br>Nárayanpur Fort   | h.s.<br>51 16 32<br>70 48 17             | 4 578904<br>4 661876<br>4 614758 | 37923<br>45907<br>41187    | 7.182<br>8.604<br>7.801    | 18              | Thanela, VI<br>Karri<br>Tilona Temple               | h.s.<br>6 34 20<br>9 7 45     | 4 150899<br>4 292732<br>4 524629 | 14155<br>19621<br>33468   | 2.681<br>3.716<br>6.339    | †               | †    |
| 73              | Chandla, III<br>Nagroa<br>Gulganj Fort      | h.s.<br>44 46 42<br>68 11 20             | 4 498425<br>4 618368<br>4 614758 | 31508<br>41531<br>41187    | 5.967<br>7.866<br>7.801    | 18              | Thanela, VI<br>Putli Bakoára<br>Mankahri House      | h.s.<br>57 43 45<br>53 6 15   | 4 287797<br>4 263008<br>4 331300 | 19100<br>18349<br>21444   | 3.674<br>3.475<br>4.061    | †               | †    |
| 74              | Chandla, III<br>Nagroa<br>Ragauni Fort      | h.s.<br>18 27 39<br>114 55 21            | 4 253947<br>4 710908<br>4 614758 | 17945<br>51393<br>41187    | 3.399<br>9.734<br>7.801    | 18              | Chandla, III<br>Datiára, V<br>Mau Saria Temple      | h.s.<br>12 49 1<br>39 56 32   | 4 706505<br>5 168016<br>5 261438 | 50875<br>147237<br>182574 | 9.635<br>27.886<br>34.578  | 18              | 18   |
| 75              | Bhoraj, IV<br>Datiára, V<br>Sonár Hill Mark | h.s.<br>34 12 42<br>60 15 15             | 4 908830<br>5 097537<br>5 157579 | 81064<br>125180<br>143740  | 15.353<br>23.768<br>27.224 | 18              | Chandla, III<br>Datiára, V<br>Palera Temple         | h.s.<br>18 29 58<br>62 24 59  | 4 768383<br>5 214518<br>5 261438 | 58666<br>163877<br>182574 | 11.111<br>31.037<br>34.578 | 18              | 18   |
| 76              | Datiára, V<br>Manang, VII<br>Seyah          | h.s.<br>50 42 5<br>49 22 23              | 5 017624<br>5 009186<br>5 122216 | 104142<br>102138<br>132500 | 19.724<br>19.344<br>25.095 | 18              | Datiára, V<br>Thanela, VI<br>Lughási Fort           | h.s.<br>12 46 32<br>13 30 56  | 4 828588<br>4 852612<br>5 130273 | 67389<br>71222<br>134981  | 12.763<br>13.489<br>25.565 | 18              | 18   |
| 77              | Thanela, VI<br>Manang, VII<br>Seyah         | h.s.<br>55 54 29<br>15 16 38             | 5 017624<br>4 520285<br>5 075672 | 104142<br>33135<br>119034  | 19.724<br>6.276<br>22.544  | 18              | Thanela, VI<br>Manang, VII<br>Malka Temple          | h.s.<br>7 9 37<br>8 40 21     | 4 735455<br>4 818141<br>5 075672 | 54382<br>65787<br>119034  | 10.300<br>12.460<br>22.544 | 18              | 18   |
| 78              | Thanela, VI<br>Seyah<br>Karri               | h.s.<br>109 54 37<br>35 14 45            | 4 736621<br>4 524629<br>4 520285 | 54528<br>33468<br>33135    | 10.327<br>6.339<br>6.276   | 18              | Manang, VII<br>Phára, IX<br>Charkhári Fort          | h.s.<br>22 59 50<br>9 6 11    | 5 024827<br>4 632234<br>5 158422 | 105883<br>42878<br>144020 | 20.054<br>8.121<br>27.276  | 18              | 18   |
| 79              | Thanela, VI<br>Chhatarpur Temple<br>Karri   | h.s.<br>60 12 20<br>86 26 8              | 4 722786<br>4 524629<br>4 783518 | 52818<br>33468<br>60746    | 10.003<br>6.339<br>11.505  | 18              | Nágonáth, VIII<br>Phára, IX<br>Túrah Shergarh       | h.s.<br>19 8 35<br>9 4 52     | 4 989279<br>4 671697<br>5 148291 | 97562<br>46957<br>140099  | 18.478<br>8.893<br>26.648  | 18              | 18   |
| 80              | Thanela, VI<br>Karri<br>Putli Bakoára       | h.s.<br>99 46 19<br>29 39 41<br>50 34 0  | 4 630459<br>4 331300<br>4 524629 | 42703<br>21444<br>33468    | 8.088<br>4.061<br>6.339    | 18              | Nágonáth, VIII<br>Túrah Shergarh<br>Churári Temple  | h.s.<br>51 10 38<br>95 28 15  | 4 823095<br>4 929525<br>4 671697 | 66542<br>85021<br>46957   | 12.603<br>16.102<br>8.893  | 18              | 18   |
| 81              | Karri<br>Putli Bakoára<br>Gara Sandna       | h.s.<br>32 15 10<br>59 26 11             | 4 695235<br>4 422684<br>4 630459 | 49572<br>26466<br>42703    | 9.389<br>5.012<br>8.088    | 18              | Nágonáth, VIII<br>Túrah Shergarh<br>Gogora Temple   | h.s.<br>27 18 22<br>116 16 30 | 4 559712<br>4 850779<br>4 671697 | 36284<br>70922<br>46957   | 6.872<br>15.432<br>8.893   | 18              | 18   |
| 82              | Thanela, VI<br>Putli Bakoára<br>Gara Sandna | h.s.<br>72 46 33<br>82 49 10<br>24 24 17 | 4 695235<br>4 711742<br>4 331300 | 49572<br>51492<br>21444    | 9.389<br>9.752<br>4.061    | 18              | Nágonáth, VIII<br>Túrah Shergarh<br>Seonri Temple   | h.s.<br>39 36 6<br>22 20 5    | 4 530463<br>4 305822<br>4 671697 | 33921<br>20222<br>46957   | 6.424<br>3.830<br>8.893    | 18              | 18   |
| 83              | Karri<br>Gara Sandna<br>Mukána Hill Mark    | h.s.<br>39 4 48<br>122 27 30             | 4 721697<br>4 848307<br>4 422684 | 52686<br>70519<br>26466    | 9.978<br>13.356<br>5.012   | 18              | Nágonáth, VIII<br>Gokulphára, X<br>Rewábarti Temple | h.s.<br>29 16 1<br>27 10 21   | 4 827061<br>4 797463<br>5 058662 | 67152<br>62728<br>114462  | 12.718<br>11.880<br>21.678 | 18              | 18   |

† Instrument not known.

| No. of Triangle | Station                                             | Corrected Plane Angle | Distance                                     |                           |                            | No. of Triangle | Station                                      | Corrected Plane Angle | Distance                                     |                          |                            | Theodolite used |
|-----------------|-----------------------------------------------------|-----------------------|----------------------------------------------|---------------------------|----------------------------|-----------------|----------------------------------------------|-----------------------|----------------------------------------------|--------------------------|----------------------------|-----------------|
|                 |                                                     |                       | Log. feet                                    | Feet                      | Miles                      |                 |                                              |                       | Log. feet                                    | Feet                     | Miles                      |                 |
| 97              | Nágonáth, VIII<br>Phára, IX<br>Rewábarti Temple     | 30 52 12<br>20 19 57  | 4° 06' 74.5<br>4° 79' 46.3<br>5° 148' 29.1   | 92628<br>62728<br>140699  | 17.543<br>11.880<br>26.648 | 110             | Gokulphára, X<br>Kanwa, XII<br>Chirauli Fort | 18 33 16<br>6 36 52   | 4° 92' 42.84<br>4° 48' 20.82<br>5° 05' 02.59 | 84001<br>30408<br>112269 | 15.909<br>5.759<br>21.263  | Inch<br>18<br>" |
| 98              | Nágonáth, VIII<br>Phára, IX<br>Mardángalb Temple    | 8 7 46<br>9 50 13     | 4° 80' 57.3<br>4° 89' 16.5<br>5° 148' 29.1   | 64502<br>77928<br>140699  | 12.216<br>14.759<br>26.648 | 111             | Gokulphára, X<br>Badarwára<br>Kalra          | 58 56 14<br>60 59 55  | 4° 56' 00.10<br>4° 57' 80.44<br>4° 57' 40.42 | 37069<br>37848<br>37501  | 7.021<br>7.168<br>7.102    | "<br>"<br>"     |
| 99              | Nágonáth, VIII<br>Gokulphára, X<br>Kacher Hill Mark | 10 44 12<br>19 4 44   | 4° 63' 23.25<br>4° 87' 64.97<br>5° 05' 86.62 | 42887<br>75248<br>114462  | 8.123<br>14.252<br>21.678  | 112             | Gokulphára, X<br>Badarwára<br>Perona Fort    | 44 21 43<br>94 42 55  | 4° 60' 23.67<br>4° 75' 63.01<br>4° 57' 40.42 | 40028<br>57056<br>37501  | 7.581<br>10.806<br>7.102   | 18<br>"<br>"    |
| 100             | Gokulphára, X<br>Kanwa, XII<br>Badarwára            | 96 2 58<br>17 47 24   | 5° 08' 65.64<br>4° 57' 40.42<br>5° 05' 02.59 | 122057<br>37501<br>112269 | 23.117<br>7.102<br>21.263  | 113             | Kanwa, XII<br>Nipania, XIII<br>Atária        | 24 53 51<br>34 3 41   | 4° 76' 35.54<br>4° 88' 75.26<br>5° 07' 21.54 | 58017<br>77184<br>118074 | 10.988<br>14.618<br>22.362 | 18<br>"<br>"    |
| 101             | Gokulphára, X<br>Badarwára<br>Garwai Fort           | 39 10 6<br>66 4 25    | 4° 39' 00.36<br>4° 55' 05.72<br>4° 57' 40.42 | 24549<br>35528<br>37501   | 4.649<br>6.729<br>7.102    | 114             | Gura, XI<br>Kanwa, XII<br>Atária             | 46 7 10<br>26 20 37   | 4° 88' 75.26<br>4° 67' 68.61<br>5° 00' 09.51 | 77184<br>47518<br>102106 | 14.618<br>9.000<br>19.338  | "<br>"<br>"     |
| 102             | Gokulphára, X<br>Badarwára<br>Sagauli Temple        | 14 58 24<br>144 48 40 | 4° 44' 77.68<br>4° 79' 01.56<br>4° 57' 40.42 | 28039<br>62540<br>37501   | 5.310<br>11.845<br>7.102   | 115             | Gokulphára, X<br>Kanwa, XII<br>Himilia       | 37 39 33<br>122 58 39 | 4° 64' 71.16<br>4° 91' 25.72<br>5° 05' 02.59 | 44373<br>81766<br>112269 | 8.404<br>15.486<br>21.263  | "<br>"<br>"     |
| 103             | Gokulphára, X<br>Badarwára<br>Koratha Temple        | 32 33 29<br>26 54 45  | 4° 36' 97.59<br>4° 29' 45.95<br>4° 57' 40.42 | 23429<br>19706<br>37501   | 4.437<br>3.732<br>7.102    | 116             | Gokulphára, X<br>Gura, XI<br>Himilia         | 43 29 40<br>102 43 30 | 4° 81' 98.89<br>4° 91' 25.72<br>5° 06' 10.04 | 66052<br>81766<br>115879 | 12.510<br>15.486<br>21.947 | 18<br>"<br>"    |
| 104             | Gokulphára, X<br>Badarwára<br>Dhanora Temple        | 90 25 15<br>16 49 17  | 4° 59' 39.99<br>4° 05' 54.93<br>4° 57' 40.42 | 39264<br>11363<br>37501   | 7.436<br>2.152<br>7.102    | 117             | Gura, XI<br>Atária<br>Muhammadabad           | 84 59 18<br>40 15 48  | 4° 76' 31.75<br>4° 57' 27.74<br>4° 67' 08.61 | 57966<br>37607<br>47518  | 10.978<br>7.123<br>9.000   | 18<br>"<br>"    |
| 105             | Gokulphára, X<br>Badarwára<br>Dakoli Temple         | 25 58 16<br>112 4 10  | 4° 39' 02.65<br>4° 71' 58.25<br>4° 57' 40.42 | 24562<br>51979<br>37501   | 4.652<br>9.844<br>7.102    | 118             | Atária<br>Himilia<br>Muhammadabad            | 32 11 14<br>66 38 30  | 4° 52' 67.84<br>4° 76' 31.75<br>4° 79' 51.35 | 33634<br>57966<br>62593  | 6.370<br>10.978<br>11.817  | "<br>"<br>"     |
| 106             | Gokulphára, X<br>Kanwa, XII<br>Dakoli Temple        | 70 4 42<br>27 19 49   | 5° 02' 71.01<br>4° 71' 58.25<br>5° 05' 02.59 | 106439<br>51979<br>112269 | 20.159<br>9.844<br>21.263  | 119             | Gura, XI<br>Muhammadabad<br>Baukhar          | 94 13 54<br>41 41 53  | 4° 75' 11.33<br>4° 59' 46.41<br>4° 57' 27.74 | 56381<br>39322<br>37607  | 10.678<br>7.447<br>7.123   | 18<br>"<br>"    |
| 107             | Gokulphára, X<br>Badarwára<br>Kotra Temple          | 121 11 50<br>18 35 2  | 4° 69' 61.68<br>4° 26' 73.77<br>4° 57' 40.42 | 49678<br>18509<br>37501   | 9.409<br>3.505<br>7.102    | 120             | Kanwa, XII<br>Himilia<br>Girthan Fort        | 22 23 40<br>110 45 54 | 4° 36' 50.21<br>4° 75' 49.50<br>4° 64' 71.16 | 23175<br>56879<br>44373  | 4.389<br>10.772<br>8.404   | 18<br>"<br>"    |
| 108             | Gokulphára, X<br>Badarwára<br>Sayyidnagar Temple    | 79 31 17<br>31 53 10  | 4° 59' 77.84<br>4° 32' 79.13<br>4° 57' 40.42 | 39608<br>21277<br>37501   | 7.502<br>4.030<br>7.102    | 121             | Gura, XI<br>Baukhar<br>Airo Fort             | 74 13 39<br>28 45 58  | 4° 58' 92.38<br>4° 28' 82.63<br>4° 59' 46.41 | 38836<br>19421<br>39322  | 7.355<br>3.678<br>7.447    | 18<br>"<br>"    |
| 109             | Gokulphára, X<br>Badarwára<br>Chirauli Fort         | 77 29 42<br>43 50 12  | 4° 63' 20.70<br>4° 48' 08.2<br>4° 57' 40.42  | 42862<br>30408<br>37501   | 8.118<br>5.759<br>7.102    | 122             | Gura, XI<br>Baukhar<br>Parávan Temple        | 58 2 44<br>65 36 52   | 4° 60' 29.75<br>4° 63' 75.6<br>4° 59' 46.41  | 40084<br>43029<br>39322  | 7.592<br>8.149<br>7.447    | 18<br>"<br>"    |

## SECONDARY TRIANGULATION. TRIANGLES.

17 K.

| No. of Triangle | Station                                    | Corrected Plane Angle            | Distance                                     |                         |                              | Theodolite used | No. of Triangle | Station                                      | Corrected Plane Angle | Distance                                     |                          |                               | Theodolite used |
|-----------------|--------------------------------------------|----------------------------------|----------------------------------------------|-------------------------|------------------------------|-----------------|-----------------|----------------------------------------------|-----------------------|----------------------------------------------|--------------------------|-------------------------------|-----------------|
|                 |                                            |                                  | Log. feet                                    | Feet                    | Miles                        |                 |                 |                                              |                       | Log. feet                                    | Feet                     | Miles                         |                 |
| 123             | Atária<br>Himilia<br>Bargaon Building      | 10 38 2<br>75 8 17               | 4° 06' 23.92<br>4° 78' 15.41<br>4° 79' 51.35 | 11545<br>60470<br>62393 | 2° 187<br>11° 453<br>11° 817 | +               | 136             | Gura, XI<br>Karnar<br>Sandi Fort             | 64 21 44<br>90 27 47  | 4° 28' 53.42<br>4° 33' 33.39<br>3° 96' 23.30 | 19433<br>21555<br>9109   | 3° 681<br>4° 082<br>1° 737    | 18<br>+         |
| 124             | Gura, XI<br>Atária<br>Bargaon Building     | 70 25 12<br>61 49 0              | 4° 78' 15.41<br>4° 75' 26.03<br>4° 67' 68.61 | 60470<br>56572<br>47518 | 11° 455<br>10° 714<br>9° 000 | 18              | 137             | Ata<br>Karnar<br>Itaura Temple               | 111 35 26<br>34 42 30 | 4° 68' 76.33<br>4° 47' 46.43<br>4° 46' 34.10 | 48712<br>29829<br>29068  | 9° 226<br>5° 649<br>5° 505    | +               |
| 125             | Atária<br>Himilia<br>Kinia Building        | 19 58 10<br>53 18 2              | 4° 34' 73.33<br>4° 71' 79.74<br>4° 79' 51.35 | 22250<br>52237<br>62393 | 4° 214<br>9° 893<br>11° 817  | +               | 138             | Gura, XI<br>Ata<br>Chamari                   | 25 55 44<br>34 9 25   | 4° 22' 51.64<br>4° 33' 37.49<br>4° 52' 23.34 | 16794<br>21565<br>33292  | 3° 181<br>4° 084<br>6° 305    | 18              |
| 126             | Kanwa, XII<br>Atária<br>Garar Mound (lamp) | 33 14 33<br>26 49 24             | 4° 68' 86.34<br>4° 60' 41.16<br>4° 88' 75.26 | 48824<br>40102<br>77184 | 9° 247<br>7° 612<br>14° 618  | 18              | 139             | Gura, XI<br>Ata<br>Banha Fort                | 34 38 9<br>52 23 50   | 4° 27' 75.39<br>4° 42' 17.84<br>4° 52' 23.34 | 18947<br>26411<br>33292  | 3° 588<br>5° 002<br>6° 305    | 18              |
| 127             | Gura, XI<br>Atária<br>Garar Mound (lamp)   | 50 53 25<br>80 42 49             | 4° 68' 86.34<br>4° 79' 51.43<br>4° 67' 68.61 | 48824<br>62394<br>47518 | 9° 247<br>11° 817<br>9° 000  | +               | 140             | Kanwa, XII<br>Himilia<br>Kukargaoon Building | 47 12 21<br>60 29 26  | 4° 53' 37.46<br>4° 60' 78.25<br>4° 64' 71.16 | 34178<br>40534<br>44373  | 6° 473<br>7° 677<br>8° 404    | 18              |
| 128             | Kanwa, XII<br>Himilia<br>Dantoli Temple    | 13 22 56<br>6 49 54              | 4° 47' 30.85<br>4° 18' 40.10<br>4° 64' 71.16 | 29722<br>15276<br>44373 | 5° 629<br>2° 893<br>8° 404   | 18              | 141             | Gura, XI<br>Nipania, XIII<br>Kalpi           | 39 17 0<br>62 7 41    | 4° 79' 37.63<br>4° 93' 70.2<br>4° 98' 33.81  | 62196<br>86836<br>96290  | 11° 780<br>16° 446<br>18° 237 | 18              |
| 129             | Nipania, XIII<br>Atária<br>Ata             | 32 3 54<br>86 59 22<br>60 56 44  | 4° 54' 69.60<br>4° 82' 13.64<br>4° 76' 35.54 | 35234<br>66277<br>58017 | 6° 673<br>12° 552<br>10° 988 | 18              | 142             | Kanwa, XII<br>Nipania, XIII<br>Gujnor        | 29 48 8<br>20 12 6    | 4° 88' 42.38<br>4° 72' 61.03<br>5° 07' 21.54 | 76602<br>53223<br>118074 | 14° 508<br>10° 080<br>22° 362 | 18              |
| 130             | Gura, XI<br>Atária<br>Ata                  | 47 48 33<br>44 25 57<br>87 45 30 | 4° 54' 69.60<br>4° 52' 23.34<br>4° 67' 68.61 | 35234<br>33292<br>47518 | 6° 673<br>6° 305<br>9° 000   | +               | 143             | Nipania, XIII<br>Husapur, XIV<br>Gujnor      | 37 35 34<br>48 22 55  | 4° 79' 59.37<br>4° 88' 42.38<br>5° 00' 95.02 | 62508<br>76602<br>102212 | 11° 839<br>14° 508<br>19° 358 | 18              |
| 131             | Gura, XI<br>Ata<br>Parasan Fort            | 76 48 18<br>60 48 15             | 4° 68' 19.36<br>4° 63' 45.49<br>4° 52' 23.34 | 48077<br>43107<br>33292 | 9° 105<br>8° 164<br>6° 305   | 18              | 144             | Nipania, XIII<br>Gujnor<br>Parbatpur         | 22 21 37<br>107 6 55  | 4° 48' 18.4<br>4° 79' 14.68<br>4° 88' 42.38  | 30492<br>61868<br>76602  | 5° 775<br>11° 717<br>14° 508  | 18              |
| 132             | Gura, XI<br>Atária<br>Orai Temple          | 54 48 25<br>49 32 46             | 4° 60' 29.69<br>4° 57' 19.77<br>4° 67' 68.61 | 40084<br>37323<br>47518 | 7° 592<br>7° 069<br>9° 000   | 18              | 145             | Nipania, XIII<br>Atária<br>Parbatpur         | 31 54 10<br>67 38 8   | 4° 52' 05.42<br>4° 79' 14.68<br>4° 76' 35.54 | 33154<br>61868<br>58017  | 6° 279<br>11° 717<br>10° 988  | 18              |
| 133             | Atária<br>Ata<br>Orai Temple               | 93 58 43<br>46 26 54             | 4° 74' 17.31<br>4° 60' 29.69<br>4° 54' 69.60 | 55174<br>40084<br>35234 | 10° 450<br>7° 592<br>6° 673  | +               | 146             | Atária<br>Parbatpur<br>Siahari Mound         | 23 15 50<br>30 8 10   | 4° 21' 24.86<br>4° 31' 66.77<br>4° 52' 05.42 | 16311<br>20734<br>33154  | 3° 089<br>3° 927<br>6° 279    | +               |
| 134             | Gura, XI<br>Orai Temple<br>Karnar          | 47 18 26<br>120 28 5             | 4° 50' 28.01<br>3° 96' 23.30<br>4° 57' 19.77 | 31827<br>9109<br>37323  | 6° 038<br>1° 737<br>7° 069   | 18              | 147             | Nipania, XIII<br>Parbatpur<br>Masmaria Fort  | 32 0 29<br>43 57 25   | 4° 52' 89.38<br>4° 64' 06.63<br>4° 79' 14.68 | 33802<br>44265<br>61868  | 6° 402<br>8° 384<br>11° 717   | 18              |
| 135             | Gura, XI<br>Ata<br>Karnar                  | 55 18 32<br>109 39 31            | 4° 46' 34.10<br>3° 96' 23.30<br>4° 52' 23.34 | 29068<br>9109<br>33292  | 5° 505<br>1° 737<br>6° 305   | 18              | 148             | Atária<br>Parbatpur<br>Masmaria Fort         | 80 48 2<br>23 40 43   | 4° 52' 89.38<br>4° 138' 360<br>4° 52' 05.42  | 33802<br>13752<br>33154  | 6° 402<br>2° 605<br>6° 279    | +               |

\* Base deduced by two sides and included angle. † Instrument not known.

| No. of Triangle | Station                                 | Corrected Plane Angle   | Distance                         |                         |                           | Theodolite used | No. of Triangle | Station                                            | Corrected Plane Angle    | Distance                         |                         |                            | Theodolite used |
|-----------------|-----------------------------------------|-------------------------|----------------------------------|-------------------------|---------------------------|-----------------|-----------------|----------------------------------------------------|--------------------------|----------------------------------|-------------------------|----------------------------|-----------------|
|                 |                                         |                         | Log. feet                        | Feet                    | Miles                     |                 |                 |                                                    |                          | Log. feet                        | Feet                    | Miles                      |                 |
| 149             | Ataria Parbatpur Banora Fort            | s. 11 59 3<br>15 56 33  | 4 167294<br>4 288795<br>4 520542 | 14699<br>19444<br>33154 | 2 784<br>3 683<br>6 279   | † †             | 162             | Kanwa, XII<br>Gijnor Chaki Fort                    | s. 31 32 14<br>63 58 49  | 4 446665<br>4 681707<br>4 726103 | 27968<br>48052<br>53223 | 5 297<br>9 101<br>10 080   | 18              |
| 150             | Nipania, XIII<br>Ata Mahewa Building    | s. 11 33 16<br>14 39 40 | 4 477866<br>4 579482<br>4 821364 | 30052<br>37974<br>66277 | 5 692<br>7 192<br>12 552  | 18              | 163             | Kanwa, XII<br>Gijnor Sahu Building                 | s. 13 50 39<br>88 9 51   | 4 114622<br>4 735489<br>4 726103 | 13020<br>54386<br>53223 | 2 466<br>10 300<br>10 080  | ”               |
| 151             | Ataria Himilia Urgan Temple             | s. 65 29 20<br>39 30 12 | 4 769160<br>4 613717<br>4 795135 | 58771<br>41088<br>62393 | 11 131<br>7 782<br>11 817 | † †             | 164             | Nipania, XIII<br>Kalpi Dubelkhand                  | s. 14 57 20<br>159 38 23 | 4 664018<br>4 226287<br>4 793763 | 46134<br>10838<br>62196 | 8 737<br>3 189<br>11 780   | ”               |
| 152             | Kanwa, XII<br>Himilia Urgan Temple      | s. 80 24 8<br>51 29 10  | 4 769160<br>4 668742<br>4 647116 | 58771<br>46638<br>44373 | 11 131<br>8 833<br>8 404  | 18              | 165             | Nipania, XIII<br>Dubelkhand Kalpi, Chaurasi Temple | s. 23 20 9<br>148 16 55  | 4 660428<br>4 783372<br>4 226287 | 45754<br>60726<br>10838 | 8 666<br>11 501<br>3 189   | 18              |
| 153             | Kanwa, XII<br>Gijnor Jalau Temple No. 1 | s. 6 7 20<br>10 23 34   | 4 300338<br>4 528603<br>4 726103 | 19968<br>33776<br>53223 | 3 782<br>6 397<br>10 080  | 18              | 166             | Nipania, XIII<br>Ata Katri Temple                  | s. 84 25 12<br>30 37 5   | 4 862160<br>4 571207<br>4 821364 | 72805<br>37257<br>66277 | 13 789<br>7 056<br>12 552  | 18              |
| 154             | Gijnor Parbatpur Jalau Temple No. 1     | s. 69 4 44<br>38 36 13  | 4 475583<br>4 300338<br>4 484184 | 29894<br>19968<br>30492 | 5 662<br>3 782<br>5 775   | ” †             | 167             | Nipania, XIII<br>Dubelkhand Pichora Building       | s. 34 34 17<br>99 15 40  | 4 122045<br>4 362432<br>4 226287 | 13245<br>23037<br>10838 | 2 508<br>4 363<br>3 189    | ” †             |
| 155             | Kanwa, XII<br>Gijnor Jalau Palace       | s. 5 38 54<br>9 51 43   | 4 292018<br>4 532617<br>4 726103 | 19589<br>34089<br>53223 | 3 710<br>6 456<br>10 080  | 18              | 168             | Nipania, XIII<br>Dubelkhand Pal House              | s. 75 4 21<br>31 39 40   | 4 230169<br>3 965150<br>4 226287 | 16989<br>9220<br>10838  | 3 218<br>1 748<br>3 189    | 18              |
| 156             | Ataria Parbatpur Degaon Fort            | s. 18 24 0<br>63 0 0    | 4 024657<br>4 475334<br>4 520542 | 10584<br>29877<br>33154 | 2 005<br>5 658<br>6 279   | † †             | 169             | Gijnor Parbatpur Gurgaon Fort                      | s. 56 9 13<br>36 54 0    | 4 404158<br>4 263256<br>4 484184 | 25360<br>18334<br>30492 | 4 803<br>3 472<br>5 775    | 18              |
| 157             | Ataria Parbatpur Churki Fort            | s. 61 44 5<br>45 19 15  | 4 484935<br>4 391978<br>4 520542 | 30545<br>24659<br>33154 | 5 785<br>4 670<br>6 279   | † †             | 170             | Ataria Parbatpur Samarhu Fort                      | s. 74 1 55<br>69 48 20   | 4 732544<br>4 722080<br>4 520542 | 54019<br>52733<br>33154 | 10 231<br>9 987<br>6 279   | † †             |
| 158             | Ataria Parbatpur Babai Fort             | s. 28 14 50<br>84 47 0  | 4 231730<br>4 554812<br>4 520542 | 17050<br>35877<br>33154 | 3 229<br>6 795<br>6 279   | † †             | 171             | Kanwa, XII<br>Parbatpur Sarawan Fort               | s. 58 58 4<br>66 44 14   | 4 773835<br>4 804092<br>4 750490 | 59407<br>63693<br>56298 | 11 251<br>12 063<br>10 662 | 18              |
| 159             | Ataria Parbatpur Charsoni Fort          | s. 20 8 25<br>110 11 10 | 4 175338<br>4 610846<br>4 520542 | 14974<br>40817<br>33154 | 2 836<br>7 731<br>6 279   | † †             | 172             | Kanwa, XII<br>Gijnor Sarawan Fort                  | s. 26 47 36<br>97 12 30  | 4 461496<br>4 804092<br>4 726103 | 28940<br>63693<br>53223 | 5 481<br>12 063<br>10 080  | 18              |
| 160             | Ataria Parbatpur Sarsai Fort            | s. 42 50 15<br>73 56 30 | 4 402271<br>4 552527<br>4 520542 | 25251<br>35688<br>33154 | 4 782<br>6 759<br>6 279   | † †             | 173             | Nipania, XIII<br>Gijnor Tarsor Fort                | s. 24 10 10<br>46 39 10  | 4 521220<br>4 770692<br>4 884238 | 33206<br>58978<br>70602 | 6 289<br>11 170<br>14 508  | ”               |
| 161             | Kanwa, XII<br>Gijnor Orekhi Fort        | s. 21 9 31<br>48 18 3   | 4 312079<br>4 627747<br>4 726103 | 20515<br>42437<br>53223 | 3 885<br>8 037<br>10 080  | 18              | 174             | Husapura, XIV<br>Gijnor Tarsor Fort                | s. 31 24 15<br>47 22 21  | 4 521220<br>4 671066<br>4 795937 | 33206<br>46888<br>62508 | 6 289<br>8 880<br>11 839   | ”               |

\* Base deduced by two sides and included angle. † Instrument not known.

## SECONDARY TRIANGULATION. TRIANGLES.

19 K.

| No. of Triangle | Station                                           | Corrected Plane Angle           | Distance                                     |                          |                                     | No. of Triangle | Station                                    | Corrected Plane Angle | Distance                                     |                         |                                    | Theodolite used |
|-----------------|---------------------------------------------------|---------------------------------|----------------------------------------------|--------------------------|-------------------------------------|-----------------|--------------------------------------------|-----------------------|----------------------------------------------|-------------------------|------------------------------------|-----------------|
|                 |                                                   |                                 | Log. feet                                    | Feet                     | Miles                               |                 |                                            |                       | Log. feet                                    | Feet                    | Miles                              |                 |
| 175             | Kanwa, XII<br>Gijnor<br>Kaitwa Fort               | s.<br>10 20 58<br>15 23 30      | 4° 48' 45.38<br>4° 49' 10.30<br>4° 49' 26.10 | 30518<br>81339<br>53223  | 5° 78' 0<br>15° 40' 5<br>10° 08' 0  | 188             | Sikandra<br>Deokali Temple<br>Bhadek       | 25 13 2<br>88 12 9    | 4° 33' 01.89<br>4° 66' 33.89<br>4° 70' 05.13 | 21389<br>46067<br>50178 | 4° 05' 1<br>8° 72' 5<br>9° 50' 3   | Inch<br>+       |
| 176             | Nipania, XIII<br>Husapura, XIV<br>Kuthaund Temple | 11 26 45<br>28 34 7             | 4° 49' 39.37<br>4° 48' 09.24<br>5° 00' 59.02 | 31545<br>76019<br>102212 | 5° 97' 5<br>14° 39' 8<br>19° 35' 8  | 189             | Sikandra<br>Bhadek<br>Pinarthu Temple      | 61 36 35<br>22 10 0   | 4° 61' 03.05<br>4° 24' 26.45<br>4° 66' 33.89 | 40767<br>17484<br>46067 | 7° 72' 1<br>3° 31' 1<br>8° 72' 5   | +               |
| 177             | Nipania, XIII<br>Husapura, XIV<br>Kuthaund Fort   | 12 9 36<br>30 48 52             | 4° 49' 44.72<br>4° 48' 54.16<br>5° 00' 59.02 | 31584<br>76810<br>102212 | 5° 98' 2<br>14° 54' 7<br>19° 35' 8  | 190             | Gandaspur, XV<br>Auraiya<br>Baradana Fort  | 74 51 57<br>34 50 55  | 4° 47' 58.34<br>4° 24' 81.12<br>4° 46' 49.32 | 29911<br>17706<br>29170 | 5° 66' 5<br>3° 35' 3<br>5° 52' 5   | 18<br>+         |
| 178             | Nipania, XIII<br>Gandaspur, XV<br>Sikandra        | 12 40 19<br>16 27 31            | 4° 61' 15.76<br>4° 72' 26.83<br>4° 95' 77.54 | 40886<br>52806<br>90731  | 7° 74' 4<br>10° 00' 1<br>17° 18' 4  | 191             | Husapura, XIV<br>Atsu, XVI<br>Bareh Temple | 32 50 38<br>37 47 35  | 4° 67' 91.80<br>4° 73' 22.26<br>4° 91' 06.12 | 47773<br>53979<br>83102 | 9° 04' 8<br>10° 22' 3<br>15° 73' 9 | 18<br>"         |
| 179             | Nipania, XIII<br>Sikandra<br>Jatoli Tower         | 82 16 22<br>44 13 11            | 4° 81' 35.01<br>4° 66' 09.32<br>4° 72' 26.83 | 65088<br>45809<br>52806  | 12° 32' 7<br>8° 6' 6<br>10° 00' 1   | 192             | Husapura, XIV<br>Bareh Temple<br>Yani      | 38 59 19<br>98 13 41  | 4° 53' 54.85<br>4° 56' 87.35<br>4° 73' 22.26 | 34315<br>37045<br>53979 | 6° 49' 9<br>7° 01' 6<br>10° 22' 3  | +               |
| 180             | Nipania, XIII<br>Parbatpur<br>Jatoli Tower        | 52 54 59<br>46 51 34            | 4° 69' 09.91<br>4° 66' 09.32<br>4° 79' 14.68 | 50083<br>45809<br>61868  | 9° 48' 5<br>8° 6' 6<br>11° 71' 7    | 193             | Atsu, XVI<br>Bareh Temple<br>Yani          | 42 41 29<br>70 43 44  | 4° 53' 54.85<br>4° 66' 88.83<br>4° 67' 91.80 | 34315<br>46439<br>47773 | 6° 49' 9<br>8° 79' 5<br>9° 04' 8   | 18<br>+         |
| 181             | Nipania, XIII<br>Sikandra<br>Jakha Fort           | 72 50 42<br>50 15 40            | 4° 77' 08.31<br>4° 68' 55.22<br>4° 72' 26.83 | 60235<br>48476<br>52806  | 11° 40' 8<br>9° 18' 1<br>10° 00' 1  | 194             | Husapura, XIV<br>Yani<br>Jagamanpur Fort   | 79 4 2<br>50 19 40    | 4° 67' 27.20<br>4° 56' 70.01<br>4° 56' 87.35 | 47067<br>36898<br>37045 | 8° 91' 4<br>6° 98' 8<br>7° 01' 6   | 18<br>+         |
| 182             | Nipania, XIII<br>Sikandra<br>Chhani Fort          | 72 20 2<br>54 11 40             | 4° 79' 06.84<br>4° 72' 26.88<br>4° 72' 26.83 | 62016<br>53295<br>52806  | 11° 85' 9<br>10° 09' 4<br>10° 00' 1 | 195             | Husapura, XIV<br>Yani<br>Bason Fort        | 16 51 11<br>100 0 35  | 4° 08' 06.01<br>4° 61' 16.64<br>4° 56' 87.35 | 12039<br>40894<br>37045 | 2° 28' 0<br>7° 74' 5<br>7° 01' 6   | 18<br>+         |
| 183             | Nipania, XIII<br>Sikandra<br>Kasboro Fort         | 24 32 59<br>39 0 15             | 4° 38' 09.42<br>4° 56' 09.00<br>4° 72' 26.83 | 24504<br>37119<br>52806  | 4° 64' 1<br>7° 03' 0<br>10° 00' 1   | 196             | Husapura, XIV<br>Yani<br>Tiar Fort         | 11 43 52<br>105 29 30 | 3° 92' 78.97<br>4° 60' 30.47<br>4° 56' 87.35 | 8470<br>40146<br>37045  | 1° 60' 4<br>7° 60' 3<br>7° 01' 6   | 18<br>+         |
| 184             | Nipania, XIII<br>Sikandra<br>Rasdhan Fort         | 10 49 27<br>95 16 5             | 4° 01' 37.28<br>4° 73' 82.04<br>4° 72' 26.83 | 10321<br>54727<br>52806  | 1° 95' 5<br>10° 36' 5<br>10° 00' 1  | 197             | Husapura, XIV<br>Yani<br>Nabada Fort       | 6 24 37<br>143 46 30  | 3° 92' 00.55<br>4° 64' 37.63<br>4° 56' 87.35 | 8319<br>44031<br>37045  | 1° 57' 6<br>8° 33' 9<br>7° 01' 6   | 18<br>+         |
| 185             | Gandaspur, XV<br>Sikandra<br>Auraiya              | 98 23 53<br>49 0 57             | 4° 72' 09.10<br>4° 46' 49.32<br>4° 61' 15.76 | 53581<br>29170<br>40886  | 10° 14' 8<br>5° 52' 5<br>7° 74' 4   | 198             | Husapura, XIV<br>Yani<br>Bareh Fort        | 38 10 48<br>100 26 30 | 4° 53' 59.98<br>4° 74' 12.63<br>4° 56' 87.35 | 34642<br>55114<br>37045 | 6° 56' 1<br>10° 43' 8<br>7° 01' 6  | 18<br>+         |
| 186             | Sikandra<br>Auraiya<br>Deokali Temple             | 14 26 17<br>68 15 53            | 4° 12' 93.22<br>4° 70' 05.13<br>4° 72' 26.83 | 13469<br>50178<br>53581  | 2° 55' 1<br>9° 50' 3<br>10° 14' 8   | 199             | Atsu, XVI<br>Seontara, XVII<br>Seed        | 25 3 50<br>47 25 20   | 4° 58' 82.11<br>4° 83' 83.15<br>4° 95' 06.12 | 39647<br>68915<br>89251 | 7° 50' 9<br>13° 05' 2<br>16° 90' 4 | 18<br>"         |
| 187             | Sikandra<br>Auraiya<br>Bhadek                     | 39 39 19<br>58 21 37<br>81 59 4 | 4° 53' 82.08<br>4° 66' 33.89<br>4° 72' 26.83 | 34531<br>40067<br>53581  | 6° 54' 0<br>8° 72' 5<br>10° 14' 8   | 200             | Gandaspur, XV<br>Atsu, XVI<br>Seed         | 48 48 28<br>31 7 21   | 4° 83' 83.15<br>4° 67' 51.87<br>4° 95' 06.12 | 68915<br>47336<br>90170 | 13° 05' 2<br>8° 96' 5<br>17° 07' 8 | "<br>"          |

† Instrument not known.

| No. of Triangle | Station                                          | Corrected Plane Angle      | Distance                            |                         |                              | No. of Triangle | Station                                           | Corrected Plane Angle        | Distance                            |                         |                               | Theodolite used |
|-----------------|--------------------------------------------------|----------------------------|-------------------------------------|-------------------------|------------------------------|-----------------|---------------------------------------------------|------------------------------|-------------------------------------|-------------------------|-------------------------------|-----------------|
|                 |                                                  |                            | Log. feet                           | Feet                    | Miles                        |                 |                                                   |                              | Log. feet                           | Feet                    | Miles                         |                 |
| 201             | Gandaspur, XV<br>Seed<br>Kakoto Temple           | S.<br>66 39 1<br>25 37 29  | 4° 638421<br>4° 311490<br>4° 675187 | 43493<br>20488<br>47336 | 8° 237<br>3° 880<br>8° 965   | 214             | Birona, XVIII<br>Guári<br>Gasáro Fort             | t.s.<br>25 36 4<br>91 24 31  | 4° 329693<br>4° 693975<br>4° 643949 | 21365<br>49428<br>44050 | 4° 046<br>9° 361<br>8° 343    | 18<br>+         |
| 202             | Gandaspur, XV<br>Auraiya<br>Kakoto Temple        | S.<br>15 47 59<br>30 32 12 | 4° 040558<br>4° 311490<br>4° 464932 | 10979<br>20488<br>29170 | 2° 079<br>3° 880<br>5° 525   | 215             | Atsu, XVI<br>Guári<br>Gasáro Fort                 | t.s.<br>20 37 50<br>49 47 18 | 4° 329693<br>4° 665033<br>4° 756858 | 21365<br>40306<br>57129 | 4° 046<br>8° 770<br>10° 820   | 18              |
| 203             | Gandaspur, XV<br>Seed<br>Parin Fort Mark (lamp)  | S.<br>61 21 38<br>47 34 5  | 4° 642654<br>4° 567434<br>4° 675187 | 43919<br>36935<br>47336 | 8° 318<br>6° 995<br>8° 965   | 216             | Seontára, XVII<br>Bidhuna<br>Lakna Fort           | S.<br>24 14 1<br>13 8 6      | 4° 455528<br>4° 198756<br>4° 625405 | 28545<br>15804<br>42209 | 5° 406<br>2° 993<br>7° 994    | "<br>+          |
| 204             | Atsu, XVI<br>Seontára, XVII<br>Phaphund Building | S.<br>23 35 44<br>14 30 13 | 4° 762671<br>4° 559015<br>4° 950612 | 57899<br>36226<br>89251 | 10° 066<br>6° 861<br>16° 904 | 217             | Seed<br>Guári<br>Sahár Fort                       | S.<br>55 7 19<br>52 28 12    | 4° 777967<br>4° 763248<br>4° 843155 | 59974<br>57976<br>60688 | 11° 359<br>10° 980<br>13° 198 | +               |
| 205             | Seontára, XVII<br>Seed<br>Nandu Sahál Fort       | S.<br>59 4 7<br>33 36 15   | 4° 532061<br>4° 341764<br>4° 598211 | 34046<br>21967<br>39647 | 6° 448<br>4° 160<br>7° 509   | 218             | Bidhuna<br>Guári<br>Sahár Fort                    | S.<br>111 37 53<br>27 5 23   | 4° 777967<br>4° 468061<br>4° 629045 | 59974<br>29381<br>42564 | 11° 359<br>5° 505<br>8° 061   | +               |
| 206             | Seontára, XVII<br>Seed<br>Ponti Fort             | S.<br>79 24 35<br>16 33 45 | 4° 593113<br>4° 055512<br>4° 598211 | 39184<br>11364<br>39647 | 7° 421<br>2° 152<br>7° 509   | 219             | Birona, XVIII<br>Guári<br>Ruru (Bara) Fort        | t.s.<br>23 18 33<br>86 13 51 | 4° 267068<br>4° 668770<br>4° 643949 | 18496<br>46641<br>44050 | 3° 503<br>8° 834<br>8° 343    | 18<br>+         |
| 207             | Birona, XVIII<br>Kalsán, XIX<br>Bidhuna          | S.<br>41 45 58<br>30 46 41 | 4° 833121<br>4° 718615<br>4° 989112 | 68096<br>52314<br>97524 | 12° 897<br>9° 908<br>18° 470 | 220             | Birona, XVIII<br>Guári<br>Ruru (Chhotia) Old Fort | t.s.<br>16 24 9<br>55 58 52  | 4° 115648<br>4° 583286<br>4° 643949 | 13051<br>38308<br>44050 | 2° 472<br>7° 255<br>8° 343    | 18<br>+         |
| 208             | Seontára, XVII<br>Kalsán, XIX<br>Bidhuna         | S.<br>45 8 49<br>26 4 1    | 4° 833121<br>4° 625405<br>4° 958750 | 68096<br>42209<br>90939 | 12° 897<br>7° 994<br>17° 223 | 221             | Birona, XVIII<br>Guári<br>Kudarkot Temple         | t.s.<br>14 36 58<br>8 52 22  | 4° 445432<br>4° 231643<br>4° 643949 | 27889<br>17047<br>44050 | 5° 282<br>3° 229<br>8° 343    | 18<br>+         |
| 209             | Seed<br>Bidhuna<br>Guári                         | S.<br>66 24 14<br>79 33 35 | 4° 629045<br>4° 843155<br>4° 873825 | 42564<br>69688<br>74787 | 8° 061<br>13° 108<br>14° 164 | 222             | Bidhuna<br>Guári<br>Sumáin Fort                   | S.<br>64 10 43<br>48 4 46    | 4° 616993<br>4° 534290<br>4° 629045 | 41399<br>34221<br>42564 | 7° 841<br>6° 481<br>8° 061    | +               |
| 210             | Birona, XVIII<br>Bidhuna<br>Guári                | S.<br>51 33 29<br>54 9 11  | 4° 629045<br>4° 643949<br>4° 718615 | 42564<br>44050<br>52314 | 8° 061<br>8° 343<br>9° 908   | 223             | Birona, XVIII<br>Guári<br>Sumáin Fort             | t.s.<br>69 18 15<br>26 12 34 | 4° 616993<br>4° 291045<br>4° 643949 | 41399<br>19545<br>44050 | 7° 841<br>3° 702<br>8° 343    | 18<br>+         |
| 211             | Atsu, XVI<br>Guári<br>Barsun                     | S.<br>55 54 45<br>28 47 48 | 4° 676839<br>4° 441492<br>4° 756858 | 47516<br>27037<br>57129 | 8° 099<br>5° 234<br>10° 820  | 224             | Birona, XVIII<br>Bidhuna<br>Sabhad Fort           | S.<br>23 24 28<br>82 16 20   | 4° 334174<br>4° 731123<br>4° 718615 | 21586<br>53842<br>52314 | 4° 088<br>10° 197<br>9° 908   | 18<br>+         |
| 212             | Atsu, XVI<br>Guári<br>Chachhund Fort             | S.<br>8 56 36<br>17 56 28  | 4° 293147<br>4° 590141<br>4° 756858 | 19640<br>38917<br>57129 | 3° 720<br>7° 371<br>10° 820  | 225             | Kalsán, XIX<br>Bidhuna<br>Sabhad Fort             | S.<br>10 42 39<br>25 11 1    | 4° 334174<br>4° 693926<br>4° 833121 | 21586<br>49423<br>68096 | 4° 088<br>9° 360<br>12° 897   | 18<br>"         |
| 213             | Seontára, XVII<br>Bidhuna<br>Harehandpur Fort    | S.<br>59 37 19<br>33 50 4  | 4° 562060<br>4° 371892<br>4° 625405 | 36480<br>23545<br>42209 | 6° 909<br>4° 459<br>7° 994   | 226             | Birona, XVIII<br>Guári<br>Barhind Fort            | t.s.<br>88 3 57<br>42 16 1   | 4° 761577<br>4° 589372<br>4° 643949 | 57753<br>38866<br>44050 | 10° 938<br>7° 361<br>8° 343   | 18<br>+         |

\* Base deduced by two sides and included angle. † Instrument not known.



## SECONDARY TRIANGULATION. TRIANGLES.

21—K.

| No. of Triangle | Station                                       | Corrected Plane Angle                 | Distance                         |                         |                           | No. of Triangle | Station                                         | Corrected Plane Angle            | Distance                         |                         |                           | Theodolite used |
|-----------------|-----------------------------------------------|---------------------------------------|----------------------------------|-------------------------|---------------------------|-----------------|-------------------------------------------------|----------------------------------|----------------------------------|-------------------------|---------------------------|-----------------|
|                 |                                               |                                       | Log. feet                        | Feet                    | Miles                     |                 |                                                 |                                  | Log. feet                        | Feet                    | Miles                     |                 |
| 227             | Birona, XVIII<br>Bidhuna<br>Barhind Fort      | S.<br>36 30 28<br>47 39 15            | 4 495340<br>4 589572<br>4 718615 | 31285<br>38806<br>52314 | 5 025<br>7 301<br>9 908   | 18<br>†         | Seontára, XVII<br>Akupu<br>Dabkari Temple       | 10 11 50<br>25 15 39             | 4 120874<br>4 502973<br>4 636318 | 13209<br>31810<br>43283 | 2 502<br>6 030<br>8 198   | Inch<br>18<br>† |
| 228             | Birona, XVIII<br>Bidhuna<br>Airo              | S.<br>34 28 26<br>69 19 47            | 4 484182<br>4 702445<br>4 718615 | 30492<br>50402<br>52314 | 5 775<br>9 546<br>9 908   | 18<br>†         | Seontára, XVII<br>Bidhuna<br>Dabkari Temple     | 108 19 47<br>30 3 39             | 4 780591<br>4 502973<br>4 625405 | 60338<br>31840<br>42209 | 11 428<br>6 030<br>7 994  | 18<br>†         |
| 229             | Kalsán, XIX<br>Bidhuna<br>Airo                | S.<br>23 6 44<br>118 45 42            | 4 484182<br>4 680868<br>4 833121 | 30492<br>47959<br>68090 | 5 775<br>9 083<br>12 897  | 18<br>†         | Seontára, XVII<br>Bidhuna<br>Aneso Fort         | 77 55 13<br>35 32 56             | 4 653182<br>4 427379<br>4 625405 | 44997<br>26753<br>42209 | 8 522<br>5 067<br>7 994   | 18<br>†         |
| 230             | Bidhuna<br>Airo<br>Jaraun Fort                | S.<br>48 53 48<br>82 5 27             | 4 483417<br>4 602109<br>4 484182 | 30438<br>40010<br>30492 | 5 765<br>7 578<br>5 775   | †<br>†          | Seontára, XVII<br>Akupu<br>Aneso Fort           | 20 12 44<br>26 57 14             | 4 309466<br>4 427379<br>4 636318 | 20392<br>26753<br>43283 | 3 862<br>5 067<br>8 198   | 18<br>†         |
| 231             | Kalsán, XIX<br>Airo<br>Jaraun Fort            | S.<br>37 40 13<br>36 40 15            | 4 483417<br>4 473425<br>4 680868 | 30438<br>29746<br>47959 | 5 765<br>5 634<br>9 083   | 18<br>†         | Kalsán, XIX<br>Kúrsi<br>Malhausi                | 27 25 46<br>75 53 44             | 4 436998<br>4 760327<br>4 761769 | 27353<br>57587<br>57779 | 5 180<br>10 907<br>10 943 | 18<br>†         |
| 232             | Bidhuna<br>Airo<br>Haseran Fort               | S.<br>24 18 36<br>124 19 31           | 4 382327<br>4 684675<br>4 484182 | 24117<br>48381<br>30492 | 4 568<br>9 163<br>5 775   | †<br>†          | Akupu<br>Kúrsi<br>Malhausi                      | 26 17 52<br>17 9 55<br>136 32 13 | 4 436998<br>4 260571<br>4 628076 | 27353<br>18221<br>42409 | 5 180<br>3 451<br>8 043   | †<br>†<br>†     |
| 233             | Kalsán, XIX<br>Bidhuna<br>Haseran Fort        | S.<br>28 41 13<br>13 48 58            | 4 684675<br>4 381459<br>4 833121 | 48381<br>24069<br>68096 | 9 163<br>4 559<br>12 897  | 18              | Akupu<br>Malhausi<br>Orolaki Fort               | 84 34 28<br>30 42 0              | 4 302321<br>4 012304<br>4 260571 | 20060<br>10287<br>18221 | 3 799<br>1 948<br>3 451   | †<br>†<br>†     |
| 234             | Seontára, XVII<br>Kalsán, XIX<br>Akupu        | S.<br>52 59 8<br>28 2 35<br>98 58 17  | 4 866661<br>4 636318<br>4 958750 | 73513<br>43283<br>90939 | 13 923<br>8 198<br>17 223 | "<br>†          | Seontára, XVII<br>Kalsán, XIX<br>Bela Fort Mark | 23 56 49<br>25 29 47             | 4 686480<br>4 711998<br>4 958750 | 48583<br>51523<br>90939 | 9 201<br>9 758<br>17 223  | 18<br>"         |
| 235             | Seontára, XVII<br>Akupu<br>Khánpur Fort       | S.<br>19 37 49<br>123 45 47           | 4 387114<br>4 780620<br>4 636318 | 24384<br>60342<br>43283 | 4 618<br>11 428<br>8 198  | 18<br>†         | Seontára, XVII<br>Akupu<br>Bela Fort Mark       | 29 2 19<br>94 1 55               | 4 399173<br>4 711998<br>4 636318 | 25071<br>51523<br>43283 | 4 748<br>9 758<br>8 198   | "<br>†          |
| 236             | Seontára, XVII<br>Kalsán, XIX<br>Khánpur Fort | S.<br>33 21 19<br>39 17 57            | 4 719190<br>4 780620<br>4 958750 | 52383<br>60342<br>90939 | 9 921<br>11 428<br>17 223 | 18<br>"         | Kalsán, XIX<br>Akupu<br>Sirsai Fort             | 20 15 38<br>51 11 34             | 4 428953<br>4 781205<br>4 866361 | 26851<br>60423<br>73513 | 5 085<br>11 444<br>13 923 | 18<br>†         |
| 237             | Kalsán, XIX<br>Akupu<br>Kúrsi                 | S.<br>35 13 56<br>51 42 25<br>93 3 39 | 4 628076<br>4 761769<br>4 866361 | 42469<br>57779<br>73513 | 8 043<br>10 943<br>13 923 | "<br>†<br>†     | Kalsán, XIX<br>Airo<br>Sirsai Fort              | 53 25 36<br>54 50 17             | 4 608086<br>4 615821<br>4 680868 | 40559<br>41288<br>47959 | 7 682<br>7 820<br>9 083   | 18<br>†         |
| 238             | Kalsán, XIX<br>Khánpur Fort<br>Kúrsi          | S.<br>46 29 18<br>60 15 0             | 4 641049<br>4 761769<br>4 719190 | 43757<br>57779<br>52383 | 8 287<br>10 943<br>9 921  | 18<br>†         | Kalsán, XIX<br>Kúrsi<br>Sirsai Fort             | 11 26 12<br>25 18 38             | 4 282149<br>4 615821<br>4 761769 | 19149<br>41288<br>57779 | 3 627<br>7 820<br>10 943  | 18<br>†         |
| 239             | Seontára, XVII<br>Akupu<br>Jiwa Sirsaini Fort | S.<br>12 12 11<br>6 55 45             | 4 445834<br>4 202275<br>4 636318 | 27915<br>15932<br>43283 | 5 287<br>3 017<br>8 198   | 18<br>†         | Kúrsi<br>Malhausi<br>Bhadora Fort               | 36 49 35<br>82 41 20             | 4 275078<br>4 493822<br>4 436998 | 18840<br>31176<br>27353 | 3 568<br>5 905<br>5 180   | †<br>†          |

† Instrument not known.

## RANGIR MERIDIONAL SERIES.

| No. of Triangle | Station                                 | Corrected Plane Angle       | Distance                                        |                         |                               | Theodolite used | No. of Triangle | Station                                   | Corrected Plane Angle           | Distance                                         |                         |                               | Theodolite used |
|-----------------|-----------------------------------------|-----------------------------|-------------------------------------------------|-------------------------|-------------------------------|-----------------|-----------------|-------------------------------------------|---------------------------------|--------------------------------------------------|-------------------------|-------------------------------|-----------------|
|                 |                                         |                             | Log. feet                                       | Feet                    | Miles                         |                 |                 |                                           |                                 | Log. feet                                        | Feet                    | Miles                         |                 |
| 253             | Kalsán, XIX<br>Kúrsi<br>Abath Mound     | S.<br>50 59 58<br>46 12 58  | 4° 6' 55" 721<br>4° 6' 32" 732<br>4° 7' 01" 769 | 45261<br>42047<br>57779 | 8° 57' 2<br>7° 963<br>10° 943 | Inch<br>+<br>+  | 266             | Akupu<br>Benora<br>Aman Fort              | 27 32 12<br>63 52 55            | 4° 39' 16" 52<br>4° 67' 99" 36<br>4° 7' 26" 580  | 24641<br>47836<br>53282 | 4° 667<br>9° 064<br>10° 091   | Inch<br>+<br>+  |
| 254             | Akupu<br>Kúrsi<br>Abath Mound           | S.<br>70 46 42<br>46 50 41  | 4° 6' 55" 721<br>4° 5' 36" 661<br>4° 6' 28" 076 | 45261<br>34967<br>42469 | 8° 57' 2<br>6° 623<br>8° 043  | +               | 267             | Akupu<br>Benora<br>Jankath Fort           | 29 26 20<br>88 36 15            | 4° 47' 23" 38<br>4° 78' 06" 00<br>4° 7' 26" 580  | 29671<br>60352<br>53282 | 5° 620<br>11° 430<br>10° 091  | +               |
| 255             | Akupu<br>Kúrsi<br>Gaili Fort            | S.<br>34 1 0<br>72 23 49    | 4° 59' 38" 94<br>4° 6' 53" 18<br>4° 6' 28" 076  | 24768<br>42201<br>42469 | 4° 60' 1<br>7° 993<br>8° 043  | +               | 268             | Akupu<br>Benora<br>Khairnagar Fort        | 11 9 12<br>74 25 38             | 4° 01' 44" 09<br>4° 71' 16" 30<br>4° 7' 26" 580  | 10337<br>51479<br>53282 | 1° 958<br>9° 750<br>10° 091   | +               |
| 256             | Kalsán, XIX<br>Akupu<br>Gaili Fort      | S.<br>21 3 25<br>17 41 25   | 4° 62' 53" 18<br>4° 53' 25" 56<br>4° 8' 06" 361 | 42201<br>35691<br>73513 | 7° 993<br>6° 760<br>13° 923   | 18<br>+         | 269             | Akupu<br>Benora<br>Sukhi Fort             | 10 33 7<br>40 33 3              | 4° 09' 58" 200<br>4° 64' 84" 43<br>4° 7' 26" 580 | 12537<br>44508<br>53282 | 2° 374<br>8° 430<br>10° 091   | +               |
| 257             | Kúrsi<br>Malhausi<br>Mau Building       | S.<br>61 2 38<br>69 45 30   | 4° 49' 99" 23<br>4° 53' 02" 34<br>4° 43' 09" 98 | 31617<br>33903<br>27353 | 5° 988<br>6° 421<br>5° 180    | +               | 270             | Akupu<br>Benora<br>Khairnagar Temple      | 11 35 52<br>104 52 38           | 4° 07' 79" 77<br>4° 75' 98" 86<br>4° 7' 26" 580  | 11967<br>57529<br>53282 | 2° 266<br>10° 896<br>10° 091  | +               |
| 258             | Kalsán, XIX<br>Akupu<br>Indargarh Fort  | S.<br>33 47 40<br>7 47 59   | 4° 78' 95" 34<br>4° 17' 09" 06<br>4° 8' 06" 361 | 61593<br>15028<br>73513 | 11° 665<br>2° 846<br>13° 923  | 18<br>+         | 271             | Akupu<br>Benora<br>Majelo Fort            | 33 8 19<br>75 54 23             | 4° 48' 87" 50<br>4° 73' 77" 54<br>4° 7' 26" 580  | 30814<br>54671<br>53282 | 5° 836<br>10° 354<br>10° 091  | 18<br>+         |
| 259             | Kalsán, XIX<br>Bela Fort Mark<br>Benora | S.<br>48 57 33<br>65 18 19  | 4° 60' 56" 44<br>4° 68' 79" 65<br>4° 68' 64" 80 | 40331<br>48749<br>48583 | 7° 639<br>9° 233<br>9° 201    | 18<br>+         | 272             | Kalsán, XIX<br>Benora<br>Majelo Fort      | 24 8 21<br>16 10 30             | 4° 48' 87" 50<br>4° 32' 20" 13<br>4° 68' 79" 65  | 30814<br>20990<br>48749 | 5° 836<br>3° 975<br>9° 233    | 18<br>+         |
| 260             | Kalsán, XIX<br>Akupu<br>Benora          | S.<br>46 24 45<br>41 30 22  | 4° 72' 65" 80<br>4° 68' 79" 65<br>4° 8' 06" 361 | 53282<br>48749<br>73513 | 10° 091<br>9° 233<br>13° 923  | 18<br>+         | 273             | Kalsán, XIX<br>Bisungarh, XX<br>Rauli     | 44 20 26<br>39 58 57            | 4° 82' 02" 83<br>4° 78' 37" 64<br>4° 97' 37" 19  | 66112<br>60780<br>94128 | 12° 521<br>11° 511<br>17° 827 | 18<br>"         |
| 261             | Akupu<br>Benora<br>Naili Fort           | S.<br>53 35 48<br>50 8 22   | 4° 644' 902<br>4° 624' 321<br>4° 726' 580       | 44147<br>42104<br>53282 | 8° 361<br>7° 974<br>10° 091   | +               | 274             | Bisungarh, XX<br>Chandampur, XXI<br>Rauli | 25 55 39<br>45 7 57             | 4° 610' 509<br>4° 82' 02" 83<br>4° 945' 622      | 40786<br>66112<br>88231 | 7° 725<br>12° 521<br>16° 710  | "               |
| 262             | Akupu<br>Benora<br>Auser Fort           | S.<br>35 40 27<br>34 50 5   | 4° 518' 008<br>4° 509' 006<br>4° 726' 580       | 32962<br>32285<br>53282 | 6° 243<br>6° 115<br>10° 091   | +               | 275             | Kalsán, XIX<br>Benora<br>Amolar           | 79 57 44<br>38 32 5<br>61 30 11 | 4° 737' 355<br>4° 538' 534<br>4° 687' 965        | 54620<br>34557<br>48749 | 10° 345<br>6° 545<br>9° 233   | "               |
| 263             | Akupu<br>Kúrsi<br>Auser Fort            | S.<br>128 53 14<br>21 49 45 | 4° 820' 842<br>4° 509' 006<br>4° 628' 076       | 67584<br>32285<br>42469 | 12° 800<br>6° 115<br>8° 043   | +               | 276             | Kalsán, XIX<br>Rauli<br>Amolar            | 45 5 38<br>100 58 42            | 4° 641' 981<br>4° 538' 534<br>4° 783' 764        | 43851<br>34557<br>60780 | 8° 305<br>6° 545<br>11° 511   | 18<br>+         |
| 264             | Kalsán, XIX<br>Benora<br>Bhadora Temple | S.<br>38 1 16<br>68 2 39    | 4° 494' 812<br>4° 672' 567<br>4° 687' 965       | 31247<br>47051<br>48749 | 5° 918<br>8° 911<br>9° 233    | 18<br>+         | 277             | Benora<br>Amolar<br>Tirwa Palace          | 33 21 57<br>22 41 52            | 4° 558' 805<br>4° 404' 897<br>4° 737' 355        | 36208<br>25404<br>54620 | 6° 858<br>4° 811<br>10° 345   | +               |
| 265             | Akupu<br>Benora<br>Bhadora Temple       | S.<br>27 15 13<br>24 2 14   | 4° 494' 812<br>4° 444' 450<br>4° 726' 580       | 31247<br>27826<br>53282 | 5° 918<br>5° 270<br>10° 091   | +               | 278             | Kalsán, XIX<br>Akupu<br>Tirwa Temple      | 76 53 15<br>38 27 13            | 4° 898' 827<br>4° 704' 008<br>4° 866' 361        | 79219<br>50583<br>73513 | 15° 004<br>9° 580<br>13° 923  | 18<br>+         |

† Instrument not known.

## SECONDARY TRIANGULATION. TRIANGLES.

23 K

| No. of Triangle | Station                                            | Corrected Plane Angle             | Distance                         |                         |                            | No. of Triangle used | Station                                 | Corrected Plane Angle      | Distance                         |                           |                            | No. of Triangle used | Station                                 | Corrected Plane Angle      | Distance                         |                           |                            | Theodolite used |
|-----------------|----------------------------------------------------|-----------------------------------|----------------------------------|-------------------------|----------------------------|----------------------|-----------------------------------------|----------------------------|----------------------------------|---------------------------|----------------------------|----------------------|-----------------------------------------|----------------------------|----------------------------------|---------------------------|----------------------------|-----------------|
|                 |                                                    |                                   | Log. feet                        | Feet                    | Miles                      |                      |                                         |                            | Log. feet                        | Feet                      | Miles                      |                      |                                         |                            | Log. feet                        | Feet                      | Miles                      |                 |
| 279             | Kalsán, XIX<br>Amolar<br>Tirwa Temple              | s.<br>49 29 14<br>87 28 24        | 4 585393<br>4 704008<br>4 538534 | 38494<br>59583<br>34557 | 7 291<br>9 580<br>6 545    | 18<br>+              | Sámán<br>Ber<br>Etáwah Fort (lamp)      | s.<br>32 21 2<br>106 1 47  | 4 795922<br>5 050266<br>4 889777 | 62506<br>112271<br>77585  | 11 838<br>21 263<br>14 094 | Inch<br>+            | Sámán<br>Ber<br>Etáwah Fort (lamp)      | s.<br>32 21 2<br>106 1 47  | 4 795922<br>5 050266<br>4 889777 | 62506<br>112271<br>77585  | 11 838<br>21 263<br>14 094 | Inch<br>+       |
| 280             | Kalsán, XIX<br>Bisungarh, XX<br>Rausen Fort (lamp) | 7 8 1<br>13 25 34<br>7 8 1        | 4 794031<br>4 522249<br>4 973719 | 62234<br>33285<br>94128 | 11 787<br>6 304<br>17 827  | 18<br>"              | Sámán<br>Kuita<br>Etáwah Fort (lamp)    | s.<br>65 11 14<br>95 38 9  | 5 010305<br>5 050266<br>4 568888 | 102401<br>112271<br>37059 | 19 394<br>21 263<br>7 019  | +                    | Sámán<br>Kuita<br>Etáwah Fort (lamp)    | s.<br>65 11 14<br>95 38 9  | 5 010305<br>5 050266<br>4 568888 | 102401<br>112271<br>37059 | 19 394<br>21 263<br>7 019  | +               |
| 281             | Kalsán, XIX<br>Airo<br>Rausen Fort (lamp)          | 53 32 33<br>43 31 53              | 4 589603<br>4 522249<br>4 680868 | 38869<br>33285<br>47959 | 7 362<br>6 304<br>9 083    | 18<br>+              | Birona, XVIII<br>Kuita<br>Sarhau Fort   | s.<br>58 24 57<br>27 55 51 | 4 619685<br>4 359933<br>4 688428 | 41657<br>22905<br>48801   | 7 890<br>4 338<br>9 243    | 18<br>+              | Birona, XVIII<br>Kuita<br>Sarhau Fort   | s.<br>58 24 57<br>27 55 51 | 4 619685<br>4 359933<br>4 688428 | 41657<br>22905<br>48801   | 7 890<br>4 338<br>9 243    | 18<br>+         |
| 282             | Bisungarh, XX<br>Rauli<br>Kasáve Building (lamp)   | 19 58 44<br>31 54 26              | 4 458038<br>4 647509<br>4 820283 | 28710<br>44413<br>66112 | 5 438<br>8 412<br>12 521   | 18<br>"              | Birona, XVIII<br>Dorona<br>Sarhau Fort  | s.<br>94 34 5<br>31 32 25  | 4 639969<br>4 359933<br>4 548710 | 43648<br>22905<br>35376   | 8 267<br>4 338<br>6 700    | 18<br>+              | Birona, XVIII<br>Dorona<br>Sarhau Fort  | s.<br>94 34 5<br>31 32 25  | 4 639969<br>4 359933<br>4 548710 | 43648<br>22905<br>35376   | 8 267<br>4 338<br>6 700    | 18<br>+         |
| 283             | Bisungarh, XX<br>Chandampur, XXI<br>Kasáve Fort    | 45 54 23<br>28 53 41              | 4 817333<br>4 645213<br>4 945622 | 65665<br>44179<br>88231 | 12 437<br>8 367<br>16 710  | 18<br>"              | Dorona<br>Kuita<br>Manan Fort           | s.<br>50 5 14<br>75 11 14  | 4 436348<br>4 536862<br>4 463441 | 27312<br>34424<br>29070   | 5 173<br>6 520<br>5 506    | +                    | Dorona<br>Kuita<br>Manan Fort           | s.<br>50 5 14<br>75 11 14  | 4 436348<br>4 536862<br>4 463441 | 27312<br>34424<br>29070   | 5 173<br>6 520<br>5 506    | +               |
| 284             | Birona, XVIII<br>Bisungarh, XX<br>Sámán            | 51 13 28<br>57 59 27<br>70 47 5   | 4 893854<br>4 930356<br>4 977084 | 78317<br>85184<br>94860 | 14 833<br>16 133<br>17 965 | 18<br>"              | Birona, XVIII<br>Dorona<br>Manan Fort   | s.<br>64 18 4<br>47 52 41  | 4 536862<br>4 452335<br>4 548710 | 34424<br>28336<br>35376   | 6 520<br>5 367<br>6 700    | 18<br>+              | Birona, XVIII<br>Dorona<br>Manan Fort   | s.<br>64 18 4<br>47 52 41  | 4 536862<br>4 452335<br>4 548710 | 34424<br>28336<br>35376   | 6 520<br>5 367<br>6 700    | 18<br>+         |
| 285             | Birona, XVIII<br>Sámán<br>Sakráwa                  | 58 48 42<br>84 48 16              | 4 864349<br>4 705340<br>4 930356 | 73173<br>50739<br>85184 | 13 858<br>9 610<br>16 133  | 18<br>+              | Birona, XVIII<br>Dorona<br>Táka Fort    | s.<br>44 36 15<br>25 49 36 | 4 421014<br>4 213688<br>4 548710 | 26364<br>16356<br>35376   | 4 993<br>3 098<br>6 700    | 18<br>+              | Birona, XVIII<br>Dorona<br>Táka Fort    | s.<br>44 36 15<br>25 49 36 | 4 421014<br>4 213688<br>4 548710 | 26364<br>16356<br>35376   | 4 993<br>3 098<br>6 700    | 18<br>+         |
| 286             | Bisungarh, XX<br>Sámán<br>Sakráwa                  | 66 32 23<br>34 24 3<br>79 3 34    | 4 864349<br>4 653852<br>4 893854 | 73173<br>45066<br>78317 | 13 858<br>8 535<br>14 833  | 18<br>"              | Dorona<br>Kuita<br>Táka Fort            | s.<br>72 8 19<br>50 5 50   | 4 514689<br>4 421014<br>4 463441 | 32711<br>26364<br>29070   | 6 195<br>4 993<br>5 506    | +                    | Dorona<br>Kuita<br>Táka Fort            | s.<br>72 8 19<br>50 5 50   | 4 514689<br>4 421014<br>4 463441 | 32711<br>26364<br>29070   | 6 195<br>4 993<br>5 506    | +               |
| 287             | Birona, XVIII<br>Sakráwa<br>Dorona                 | 28 55 23<br>40 51 57<br>110 12 40 | 4 417458<br>4 548710<br>4 705340 | 26149<br>35376<br>50739 | 4 952<br>6 700<br>9 610    | 18<br>"              | Dorona<br>Kuita<br>Agani Fort           | s.<br>35 24 30<br>63 12 52 | 4 231356<br>4 419083<br>4 463441 | 17036<br>26247<br>29070   | 3 226<br>4 971<br>5 506    | +                    | Dorona<br>Kuita<br>Agani Fort           | s.<br>35 24 30<br>63 12 52 | 4 231356<br>4 419083<br>4 463441 | 17036<br>26247<br>29070   | 3 226<br>4 971<br>5 506    | +               |
| 288             | Sámán<br>Sakráwa<br>Dorona                         | 18 27 49<br>43 56 19<br>117 35 52 | 4 417458<br>4 758095<br>4 864349 | 26149<br>57292<br>73173 | 4 952<br>10 851<br>13 858  | 18<br>"              | Dorona<br>Kuita<br>Punja Fort           | s.<br>20 38 53<br>136 3 35 | 4 413696<br>4 707683<br>4 463441 | 25924<br>51013<br>29070   | 4 910<br>9 662<br>5 506    | +                    | Dorona<br>Kuita<br>Punja Fort           | s.<br>20 38 53<br>136 3 35 | 4 413696<br>4 707683<br>4 463441 | 25924<br>51013<br>29070   | 4 910<br>9 662<br>5 506    | +               |
| 289             | Birona, XVIII<br>Dorona<br>Kuita                   | 36 9 8<br>97 57 55<br>45 52 57    | 4 463441<br>4 688428<br>4 548710 | 29070<br>48801<br>35376 | 5 506<br>9 243<br>6 700    | 18<br>"              | Sámán<br>Kuita<br>Munj Building         | s.<br>46 58 53<br>82 22 40 | 4 544600<br>4 676750<br>4 568888 | 35043<br>47506<br>37059   | 6 637<br>8 997<br>7 019    | +                    | Sámán<br>Kuita<br>Munj Building         | s.<br>46 58 53<br>82 22 40 | 4 544600<br>4 676750<br>4 568888 | 35043<br>47506<br>37059   | 6 637<br>8 997<br>7 019    | +               |
| 290             | Sámán<br>Dorona<br>Kuita                           | 26 10 51<br>119 35 36             | 4 463441<br>4 568888<br>4 758095 | 29070<br>37059<br>57292 | 5 506<br>7 019<br>10 851   | 18<br>"              | Birona, XVIII<br>Kuita<br>Díg Fort      | s.<br>15 26 14<br>72 43 20 | 4 113831<br>4 668599<br>4 688428 | 12997<br>46623<br>48801   | 2 461<br>8 830<br>9 243    | 18<br>+              | Birona, XVIII<br>Kuita<br>Díg Fort      | s.<br>15 26 14<br>72 43 20 | 4 113831<br>4 668599<br>4 688428 | 12997<br>46623<br>48801   | 2 461<br>8 830<br>9 243    | 18<br>+         |
| 291             | Birona, XVIII<br>Sámán<br>Ber                      | 62 21 8<br>41 5 50                | 4 889777<br>4 760222<br>4 930356 | 77385<br>57373<br>85184 | 14 694<br>10 904<br>16 133 | 18<br>"              | Birona, XVIII<br>Dorona<br>Kudrail Fort | s.<br>24 54 45<br>38 15 3  | 4 222724<br>4 389965<br>4 548710 | 16700<br>24545<br>35376   | 3 163<br>4 649<br>6 700    | 18<br>+              | Birona, XVIII<br>Dorona<br>Kudrail Fort | s.<br>24 54 45<br>38 15 3  | 4 222724<br>4 389965<br>4 548710 | 16700<br>24545<br>35376   | 3 163<br>4 649<br>6 700    | 18<br>+         |

† Instrument not known.

| No. of Triangle | Station                             | Corrected Plane Angle | Distance                         |                         |                         | No. of Triangle | Station                                    | Corrected Plane Angle | Distance                         |                          |                            | Theodolite used |
|-----------------|-------------------------------------|-----------------------|----------------------------------|-------------------------|-------------------------|-----------------|--------------------------------------------|-----------------------|----------------------------------|--------------------------|----------------------------|-----------------|
|                 |                                     |                       | Log. feet                        | Feet                    | Miles                   |                 |                                            |                       | Log. feet                        | Feet                     | Miles                      |                 |
| 305             | Dorona Kuita Kudraal Fort           | 59 42 52<br>34 55 55  | 4.401144<br>4.222724<br>4.463441 | 23185<br>16700<br>29070 | 4.770<br>3.163<br>5.506 | 318             | Sámán Kuita Saumási Fort                   | 78 34 27<br>50 10 25  | 4.668151<br>4.562199<br>4.568888 | 46575<br>36492<br>37059  | 8.821<br>6.911<br>7.019    | Inch<br>+<br>+  |
| 306             | Birona, XVIII Dorona Seonthana Fort | 32 12 50<br>88 52 10  | 4.342818<br>4.615940<br>4.548710 | 22020<br>41299<br>35376 | 4.170<br>7.822<br>6.700 | 319             | Sámán Kuita Kusmara Fort                   | 101 4 5<br>43 26 2    | 4.796801<br>4.642238<br>4.568888 | 62033<br>43877<br>37059  | 11.862<br>8.310<br>7.019   | +<br>+          |
| 307             | Sámán Kuita Baro Fort               | 42 51 55<br>67 37 5   | 4.429939<br>4.563238<br>4.568888 | 26912<br>36580<br>37059 | 5.097<br>6.928<br>7.019 | 320             | Bisungarh, XX Sámán Gangawára              | 54 48 49<br>46 27 54  | 4.814695<br>4.762634<br>4.893854 | 65267<br>57894<br>78317  | 12.361<br>10.965<br>14.833 | +<br>+          |
| 308             | Sámán Kuita Parasna Fort            | 87 42 53<br>45 46 17  | 4.707885<br>4.563484<br>4.568888 | 51037<br>36600<br>37059 | 9.666<br>6.932<br>7.019 | 321             | Sámán Gangawára Mainpuri, Court House      | 51 25 27<br>81 6 48   | 4.840411<br>4.942080<br>4.814695 | 69249<br>87514<br>65267  | 13.115<br>16.575<br>12.361 | +<br>+          |
| 309             | Dorona Kuita Laigaon Fort           | 62 25 57<br>26 16 43  | 4.411213<br>4.109696<br>4.463441 | 25776<br>12873<br>29070 | 4.882<br>2.438<br>5.506 | 322             | Bisungarh, XX Pothári, XXIII Barkhera      | 34 28 32<br>52 47 14  | 4.760250<br>4.908521<br>5.006896 | 57577<br>81007<br>101601 | 10.905<br>15.342<br>19.243 | 18<br>"         |
| 310             | Dorona Kuita Basait Fort            | 34 11 22<br>63 25 8   | 4.216964<br>4.418765<br>4.463441 | 16480<br>26228<br>29070 | 3.121<br>4.967<br>5.506 | 323             | Bisungarh, XX Chandanpur, XXI Barkhera     | 26 10 3<br>66 30 30   | 4.599531<br>4.908521<br>4.945622 | 38952<br>81007<br>88231  | 7.377<br>15.342<br>16.710  | "<br>"          |
| 311             | Sámán Kuita Bina Building           | 67 10 3<br>35 17 35   | 4.543803<br>4.340987<br>4.568888 | 34979<br>21927<br>37059 | 6.625<br>4.153<br>7.019 | 324             | Chandanpur, XXI Barkhera Chhibramau Thána  | 66 30 30<br>73 19 17  | 4.743355<br>4.762264<br>4.590531 | 55380<br>57845<br>38952  | 10.489<br>10.955<br>7.377  | "<br>"          |
| 312             | Sámán Kuita Mangáwan Building       | 92 25 25<br>33 51 45  | 4.662126<br>4.408527<br>4.568888 | 45933<br>25617<br>37059 | 8.699<br>4.852<br>7.019 | 325             | Bisungarh, XX Barkhera Chhibramau Thána    | 26 10 3<br>14 0 10    | 4.743355<br>4.482679<br>4.908521 | 55380<br>30386<br>81007  | 10.489<br>5.755<br>15.342  | "<br>"          |
| 313             | Sámán Kuita Pharenji Fort           | 20 8 15<br>14 35 37   | 4.350127<br>4.214557<br>4.568888 | 22394<br>16389<br>37059 | 4.241<br>3.104<br>7.019 | 326             | Chandanpur, XXI Pothári, XXIII Maudo       | 17 47 19<br>26 40 22  | 4.624313<br>4.791438<br>4.984657 | 42103<br>61864<br>96529  | 7.974<br>11.717<br>18.282  | "<br>"          |
| 314             | Dorona Kuita Shamsberganj Fort      | 81 4 12<br>39 32 28   | 4.523321<br>4.332506<br>4.463441 | 33367<br>21503<br>29070 | 6.320<br>4.073<br>5.506 | 327             | Bisungarh, XX Chandanpur, XXI Maudo        | 44 25 58<br>48 45 24  | 4.701438<br>4.822465<br>4.945622 | 61864<br>66445<br>88231  | 11.717<br>12.584<br>16.710 | "<br>"          |
| 315             | Sámán Kuita Kishni Fort             | 56 29 47<br>58 41 42  | 4.491762<br>4.366675<br>4.568888 | 31029<br>23263<br>37059 | 5.877<br>4.406<br>7.019 | 328             | Pothári, XXIII Barkhera Fatehgarh Church   | 31 8 34<br>93 37 23   | 4.559284<br>4.844779<br>4.760250 | 36248<br>69949<br>57577  | 6.865<br>13.248<br>10.905  | "<br>"          |
| 316             | Sámán Kuita Sauj Building           | 124 0 45<br>15 27 47  | 4.674637<br>4.182015<br>4.568888 | 47276<br>13206<br>37059 | 8.954<br>2.880<br>7.019 | 329             | Pothári, XXIII Man, XXIV Fatehgarh Church  | 32 37 47<br>47 38 2   | 4.707977<br>4.844779<br>4.969920 | 51048<br>69949<br>93308  | 9.668<br>13.248<br>17.672  | "<br>"          |
| 317             | Sámán Kuita Atsara Fort             | 100 20 10<br>18 51 45 | 4.620801<br>4.137510<br>4.568888 | 41764<br>13725<br>37059 | 7.910<br>2.599<br>7.019 | 330             | Pothári, XXIII Barkhera Farrukhabad Temple | 42 3 23<br>52 19 7    | 4.587503<br>4.659926<br>4.760250 | 38681<br>45701<br>57577  | 7.326<br>8.655<br>10.905   | "<br>"          |

† Instrument not known.

## SECONDARY TRIANGULATION. TRIANGLES.

25—K.

| No. of Triangle | Station                                           | Corrected Plane Angle             | Distance                         |                          |                            | No. of Triangle | Station                                                    | Corrected Plane Angle            | Distance                         |                          |                            | Theodolite used | Inch |
|-----------------|---------------------------------------------------|-----------------------------------|----------------------------------|--------------------------|----------------------------|-----------------|------------------------------------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|-----------------|------|
|                 |                                                   |                                   | Log. feet                        | Feet                     | Miles                      |                 |                                                            |                                  | Log. feet                        | Feet                     | Miles                      |                 |      |
| 331             | Pothári, XXIII<br>Man, XXIV<br>Farrukhabad Temple | 21 42 58<br>18 23 38              | 4.729072<br>4.639926<br>4.999920 | 53588<br>45701<br>93308  | 10.149<br>8.655<br>17.672  | 343             | Kasrak, XXVIII<br>Janjiri, XXIX<br>Khera Bajhera           | 44 8 13<br>22 14 57<br>113 36 50 | 4.857340<br>4.592717<br>4.976517 | 72001<br>39149<br>94737  | 13.637<br>7.415<br>17.943  | "               | 18   |
| 332             | Pothári, XXIII<br>Barkhera<br>Farrukhabad Palace  | 41 22 34<br>61 0 19               | 4.590671<br>4.712312<br>4.760250 | 38965<br>51560<br>57577  | 7.380<br>9.765<br>10.905   | 344             | Kasrak, XXVIII<br>Khera Bajhera<br>Sháhábád                | 31 51 2<br>95 23 20              | 4.414134<br>4.689818<br>4.592717 | 25950<br>48957<br>39149  | 4.915<br>9.272<br>7.415    | "               | 18   |
| 333             | Pothári, XXIII<br>Man, XXIV<br>Farrukhabad Palace | 22 23 47<br>23 17 23              | 4.696235<br>4.712312<br>4.909920 | 49686<br>51560<br>93308  | 9.410<br>9.765<br>17.672   | 345             | Kasrak, XXVIII<br>Janjiri, XXIX<br>Dilwári Mound           | 31 6 13<br>60 14 34              | 4.689781<br>4.915225<br>4.976517 | 48953<br>82267<br>94737  | 9.271<br>15.581<br>17.943  | "               | 18   |
| 334             | Pothári, XXIII<br>Farrukhabad Temple<br>Nawálganj | 96 6 41<br>63 29 45               | 4.705675<br>4.250296<br>4.639926 | 50778<br>17795<br>45701  | 9.617<br>3.370<br>8.655    | 346             | Kasrak, XXVIII<br>Gajnera, XXX<br>Faridpur Thána           | 32 37 56<br>39 25 42             | 4.758362<br>4.829427<br>5.004932 | 57327<br>67519<br>101142 | 10.857<br>12.788<br>19.156 | "               | "    |
| 335             | Pothári, XXIII<br>Man, XXIV<br>Roshanabad House   | 39 15 33<br>24 21 39              | 4.818963<br>4.633081<br>4.909920 | 65912<br>42962<br>93308  | 12.483<br>8.137<br>17.672  | 347             | Kasrak, XXVIII<br>Janjiri, XXIX<br>Faridpur Thána          | 24 56 10<br>40 20 47             | 4.643158<br>4.829427<br>4.976517 | 43970<br>67519<br>94737  | 8.328<br>12.788<br>17.943  | "               | "    |
| 336             | Man, XXIV<br>Guri, XXV<br>Roshanabad House        | 40 7 33<br>42 13 53               | 4.800713<br>4.818963<br>4.987636 | 63199<br>65912<br>97193  | 11.970<br>12.483<br>18.408 | 348             | Janjiri, XXIX<br>Fatehganj, XXXI<br>Ismailpur House (lamp) | 31 41 21<br>42 19 10             | 4.759055<br>4.866823<br>5.021499 | 57419<br>73591<br>105075 | 10.875<br>13.938<br>19.901 | "               | "    |
| 337             | Man, XXIV<br>Guri, XXV<br>Shamsabad               | 28 28 50<br>51 27 59              | 4.672747<br>4.887698<br>4.987636 | 47070<br>77214<br>97193  | 8.915<br>14.624<br>18.408  | 349             | Fatehganj, XXXI<br>Ismailpur House (lamp)<br>Unchagaon     | 51 1 47<br>76 37 31              | 4.661681<br>4.669559<br>4.759055 | 45886<br>46726<br>57419  | 8.691<br>8.850<br>10.875   | "               | +    |
| 338             | Man, XXIV<br>Guri, XXV<br>Jalálabad               | 47 58 28<br>54 20 31              | 4.868648<br>4.997578<br>4.997636 | 73901<br>80831<br>97193  | 13.996<br>15.309<br>18.408 | 350             | Janjiri, XXIX<br>Ismailpur House (lamp)<br>Unchagaon       | 38 32 28<br>87 48 45             | 4.661681<br>4.773138<br>4.866823 | 45886<br>59311<br>73591  | 8.691<br>11.233<br>13.938  | 18              | +    |
| 339             | Man, XXIV<br>Dhaka, XXVI<br>Jalálabad             | 5 38 53<br>38 44 43               | 4.104174<br>4.997578<br>4.955939 | 12711<br>80831<br>90352  | 2.407<br>15.309<br>17.112  | 351             | Janjiri, XXIX<br>Unchagaon<br>Parbata                      | 48 52 38<br>28 52 18             | 4.660111<br>4.466954<br>4.773138 | 45721<br>29306<br>59311  | 8.659<br>5.550<br>11.233   | 18              | +    |
| 340             | Dhaka, XXVI<br>Saipur, XXVII<br>Bodona            | 13 19 19<br>12 10 16<br>154 30 25 | 4.757526<br>4.718937<br>5.028875 | 57217<br>52352<br>106875 | 10.837<br>9.915<br>20.241  | 352             | Janjiri, XXIX<br>Fatehganj, XXXI<br>Bareilly Kachahri      | 23 50 33<br>23 16 55             | 4.763115<br>4.753372<br>5.021499 | 57958<br>56672<br>105075 | 10.977<br>10.733<br>19.901 | 18              | "    |
| 341             | Jalálabad<br>Bodona<br>Ekri House (lamp)          | 55 33 42<br>63 3 25               | 4.716479<br>4.750264<br>4.743573 | 52057<br>56268<br>55408  | 9.859<br>10.657<br>10.494  | 353             | Janjiri, XXIX<br>Fatehganj, XXXI<br>Bareilly House         | 16 16 34<br>26 16 35             | 4.638953<br>4.837493<br>5.021499 | 43546<br>68785<br>105075 | 8.247<br>13.027<br>19.901  | "               | "    |
| 342             | Dhaka, XXVI<br>Bodona<br>Bari Matána Mound        | 43 11 46<br>62 29 55              | 4.570811<br>4.683362<br>4.718937 | 37223<br>48235<br>52352  | 7.050<br>9.135<br>9.915    | 354             | Janjiri, XXIX<br>Fatehganj, XXXI<br>Aliganj Building       | 23 18 28<br>39 49 8              | 4.668463<br>4.877556<br>5.021499 | 46608<br>75432<br>105075 | 8.827<br>14.286<br>19.901  | "               | "    |

\* Base deduced by two sides and included angle. † Instrument not known.

June 1879.

J. B. N. HENNESSEY,  
In charge of Computing Office.

# RANGIR MERIDIONAL SERIES.

## AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL,

## PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

The following table contains, in the first column, the name of each Principal, Principal-Auxiliary, or Secondary Station, at which azimuths of surrounding Points have been measured; immediately followed by those azimuths. The second column contains the number of the triangle which gives the distance between the Station and the Point.

| Name of station with azimuths of surrounding points                                                                                                                                   | No. of triangle giving distance                                                                                                            | Name of station with azimuths of surrounding points                                                                                                                                                                                | No. of triangle giving distance                                                                                            | Name of station with azimuths of surrounding points                                                                                                                                                                                                                        | No. of triangle giving distance                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| AIRO s.<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Haseran Fort<br>Kalsán, XIX<br>Jaraun Fort<br>Siráo Fort<br>Bidhúna                                                                 | 74 54 17<br>196 24 55<br>234 22 59<br>239 56 48<br>276 37 3<br>294 47 5<br>s. 338 42 30                                                    | AKUPU s.<br>Bhadaura Temple<br>Abath Mound<br>Khánpur Fort<br>Sukhi Fort<br>Tirwa Temple<br>Benora<br>Sirsai Fort<br>Khairnagar Fort<br>Khairnagar Temple<br>Oroláki Fort<br>Anan Fort<br>Jankath Fort<br>Auser Fort<br>Naili Fort | 228<br>281<br>282<br>289<br>280<br>250<br>228<br>240<br>234<br>239<br>243<br>237<br>245<br>255<br>248<br>234<br>258<br>271 | AMOLAR s.<br>Tirwa Palace<br>Benora<br>ÁTA s.<br>Gura, XI<br>Karmar<br>Chamári<br>Orai Temple<br>Banha Fort<br>Atária<br>Nipania, XIII<br>Mahewa Building<br>Katri Temple<br>Itaura Temple<br>Parasan Fort<br>ATARIA, XI*<br>Fatehganj, XXXI<br>Sigarh, X*<br>Gajnera, XXX | 265<br>254<br>235<br>269<br>278<br>260<br>249<br>268<br>270<br>246<br>266<br>267<br>262<br>261<br>275<br>276<br>279 |
| AKUPU s.<br>Dabkari Temple<br>Seontára, XVII<br>Jiwa Sirsaini Fort<br>Aneso Fort<br>Kúrsi<br>Malhausi<br>Gaili Fort<br>Bela Fort Mark<br>Kalsán, XIX<br>Indargarh Fort<br>Majelo Fort | 38 34 49<br>63 50 28<br>70 46 13<br>90 47 42<br>s. 111 6 20<br>" 137 24 12<br>145 7 20<br>157 52 23<br>162 48 45<br>170 36 44<br>171 10 48 | AMOLAR s.<br>Kalsán, XIX<br>Rauli<br>Tirwa Temple                                                                                                                                                                                  | 36 26 11<br>s. 137 24 53<br>308 57 47                                                                                      | 53 59 45.68<br>110 46 26.81<br>350 56 47.66                                                                                                                                                                                                                                | 83<br>84<br>88                                                                                                      |

\* Of the North-East Longitudinal Series.

| Name of station with azimuths of<br>surrounding points                                                                                                                                                                                                                                                                                      | No. of<br>triangling<br>distance                                                                                                                | Name of station with azimuths of<br>surrounding points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | No. of<br>triangling<br>distance                                                                                                                                                                                                                                   | Name of station with azimuths of<br>surrounding points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | No. of<br>triangling<br>distance                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ATARIA s.<br>Muhammadabad<br>Orai Temple<br>Rinia Building<br>Bargaon Building<br>Himilia<br>Garur Mound (lamp)<br>Kanwa, XII<br>Siahari Mound<br>Urgaon Temple<br>Parbatpur<br>Banora Fort<br>Degaon Fort<br>Charsoni Fort<br>Babai Fort<br>Sarsai Fort<br>Churki Fort<br>Samarhu Fort<br>Nipania, XIII<br>Masmara Fort<br>Áta<br>Gura, XI | 117<br>132<br>125<br>123<br>118<br>126<br>113<br>146<br>151<br>145<br>149<br>156<br>159<br>158<br>160<br>157<br>170<br>113<br>148<br>129<br>114 | BADARWARA h.s.<br>Kotra Temple<br>Gokulphara, X<br>Dhanora Temple<br>Koratha Temple<br>Garwai Fort<br><br>BADSHAHER h.s.<br>Kusmar, I<br>Bila<br><br>BAKARUA h.s.<br>Tinsmál, VII†<br>Hardua Tree<br>Kusmar, I<br><br>BAKSUA h.s.<br>Mangrai Building<br>Dálipur, II<br>Baksua Fort<br>Baksua Temple<br>Kusmar, I<br>Semra Fort<br><br>BANSARH h.s.<br>Sánra<br>Chandla, III<br>Chhatarpur Temple<br>Thanela, VI<br>Maniagarh<br>Tálgaoon Hill Mark<br>Sonha<br><br>BARKHERA s.<br>Chhibramau Thána<br>Bisungarh, XX<br>Pothári, XXIII<br>Farrukhabad Temple<br>Farrukhabad Palace<br>Fatehgarh Church<br>Chandanpur, XXI<br><br>BARSAN s.<br>Guári<br>Atsu, XVI<br><br>BAUKHAR s.<br>Muhammadabad<br>Airo Fort<br>Gura, XI<br>Parásan Temple | 107<br>100<br>104<br>108<br>101<br><br>52<br>52<br><br>39<br>45<br>39<br><br>42<br>37<br>40<br>41<br>37<br>38<br><br>63<br>61<br>61<br>62<br>66<br>65<br>64<br><br>324<br>322<br>322<br>330<br>332<br>328<br>323<br><br>211<br>211<br><br>119<br>121<br>119<br>122 | BENORA s.<br>Akupu<br>Bhadora Temple<br>Bela Fort<br>Sukhi Fort<br>Majelo Fort<br>Kalsán, XIX<br>Amolar<br>Tirva Palace<br>Khairnagar Temple<br>Jankath Fort<br>Khairnagar Fort<br>Aman Fort<br>Naili Fort<br>Auser Fort<br><br>BER s.<br>Etáwah Fort (lamp)<br>Samán<br>Birona, XVIII<br><br>BHADEK s.<br>Deokali Temple<br>Auraiya<br>Pinarhu Temple<br>Sikandra<br><br>BHORAJ, IV<br>Datára, V<br>Sonár Hill Mark<br>Chandla, III<br>Dálipur, II<br><br>BIA BARARI h.s.<br>Rangr, XI†<br>Kusmar, I<br><br>BIDHUNA s.<br>Guári<br>Birona, XVIII<br>Sumán Fort<br>Barhind Fort<br>Airo<br>Sabbad Fort<br>Haseran Fort<br>Kalsán, XIX<br>Jaraun Fort<br>Aneso Fort<br>Dabkari Temple<br>Sabár Fort<br>Seontára, XVII | 260<br>264<br>259<br>269<br>271<br>259<br>275<br>277<br>270<br>267<br>268<br>266<br>261<br>262<br><br>292<br>291<br>291<br><br>188<br>187<br>189<br>187<br><br>5<br>75<br>4<br>4<br><br>43<br>43<br><br>209<br>207<br>222<br>227<br>228<br>224<br>232<br>207<br>230<br>242<br>241<br>218<br>208 |

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

| Name of station with azimuths of surrounding points                                                                                                                                                                                                                                                                                                                         | No. of triangle giving distance                                                                                                                                         | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | No. of triangle giving distance                                                                                                                                                                              | Name of station with azimuths of surrounding points                                                                                                                                                                  | No. of triangle giving distance                                         | Name of station with azimuths of surrounding points | No. of triangle giving distance |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|
| BIDHUNA S.<br>Lakna Fort<br>Seed<br>Harchandpur Fort                                                                                                                                                                                                                                                                                                                        | 216<br>209<br>213                                                                                                                                                       | BISUNGARH, XX<br>Rauli<br>Kasave Fort<br>Kasave Building (lamp)<br>Kalsán, XIX<br>Rausen Fort (lamp)                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 273<br>288<br>282<br>20<br>280                                                                                                                                                                               | DALIPUR, II<br>Sháhgarh Fort<br>Tinsmál, VII†<br>Hasri<br>Bannora Fort<br>Bhoraj, IV<br>Dhasán River Temple<br>Senpa Temple<br>Khatoli Gateway<br>Chandla, III<br>Pola<br>Bila<br>Kusmár, I<br>Baksua<br>Hardua Tree | 47<br>2<br>46<br>48<br>4<br>58<br>56<br>57<br>3<br>54<br>49<br>37<br>44 |                                                     |                                 |
| BILA h.s.<br>Kusmár, I<br>Dálipur, II<br>Senpa Temple<br>Khatoli Gateway<br>Chandla, III<br>Bádsháhpur<br>Gopálpur<br>Gadakhár                                                                                                                                                                                                                                              | 50<br>49<br>56<br>57<br>49<br>52<br>53<br>51                                                                                                                            | BODONA S.<br>Ekri House (lamp)<br>Saipur, XXVII<br>Bari Matána Mound<br>Dháká, XXVI<br>Jalálabad                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 341<br>340<br>342<br>340<br>341                                                                                                                                                                              |                                                                                                                                                                                                                      |                                                                         |                                                     |                                 |
| BIRONA, XVIII<br>Atsu, XVI<br>Gasáro Fort<br>Sarhau Fort<br>Ber<br>Maman Fort<br>Dág Fort<br>Táka Fort<br>Kuita<br>Seonthana Fort<br>Sámán<br>Kudrail Fort<br>Dorona<br>Bisungarh, XX<br>Sakráwa<br>Kalsán, XIX<br>Barhind Fort<br>Airo<br>Sabhad Fort<br>Sumán Fort<br>Bidhúna<br>Seontára, XVII<br>Ruru (Bara) Fort<br>Ruru (Chhoia) Old Fort<br>Kudarkot Temple<br>Guári | 18<br>214<br>294<br>291<br>297<br>303<br>298<br>289<br>306<br>284<br>304<br>287<br>20<br>285<br>19<br>226<br>228<br>224<br>223<br>207<br>18<br>219<br>220<br>221<br>210 | CHAMARI S.<br>Gura, XI<br>Áta<br><br>CHANDANPUR, XXI<br>Kalsán, XIX<br>Rauli<br>Kasave Fort<br>Bisungarh, XX<br>Chhibramau Thána<br>Maudó<br>Muhammadabad, XXII<br>Barkhera<br>Pothári, XXIII<br>Mau, XXIV<br><br>CHANDLA, III<br>Kusmár, I<br>Pola<br>Bila<br>Dálipur, II<br>Dhasán River Temple<br>Bhoraj, IV<br>Gulganj Fort<br>Palera Temple<br>Datiára, V<br>Mau Saría Temple<br>Nagroa<br>Chhatarpur Temple<br>Ragauli Fort<br>Thanela, VI<br>Naráyanpur Fort<br>Bijáwar Temple<br>Bijáwar Palace<br>Maniagarh<br>Bánsparh<br>Sánra<br>Gopálpur | 138<br>138<br><br>21<br>274<br>283<br>21<br>324<br>326<br>22<br>323<br>23<br>25<br><br>3<br>54<br>49<br>3<br>58<br>4<br>73<br>88<br>5<br>87<br>68<br>59<br>74<br>6<br>72<br>70<br>71<br>67<br>61<br>63<br>53 |                                                                                                                                                                                                                      |                                                                         |                                                     |                                 |
| BISUNGARH, XX<br>Sakráwa<br>Birona, XVIII<br>Sámán<br>Gangawára<br>Pothári, XXIII<br>Muhammadabad, XXII<br>Maudó<br>Barkhera<br>Chandarpur, XXI<br>Chhibramau Thána                                                                                                                                                                                                         | 286<br>20<br>284<br>320<br>24<br>22<br>327<br>322<br>21<br>325                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                              |                                                                                                                                                                                                                      |                                                                         |                                                     |                                 |

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.



| Name of station with azimuths of surrounding points                                                                                                                              | No. of triangle giving distance                                                                                                      | Name of station with azimuths of surrounding points            | No. of triangle giving distance                                                                                                                                                                                                                                                                             | Name of station with azimuths of surrounding points                                                                                                                                                                                  | No. of triangle giving distance                                                                                | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                            | No. of triangle giving distance                                                                                                                                                                                                                                     |                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| DUEKHAND S.<br>Nipania, XIII<br>Pál House<br>Pichora Building<br>Kálpi<br>Kálpi, Chaurási Temple                                                                                 | 108 28 41<br>140 8 21<br>207 44 21<br>308 50 18<br>320 11 46                                                                         | 164<br>168<br>167<br>164<br>165                                | GIJNOR S.<br>Jálaun Temple No. 1<br>Jálaun Palace<br>Kanwa, XII<br>Oreki Fort<br>Cháki Fort<br>Sahu Building<br>Sarawan Fort<br>Husapura, XIV<br>Kaitwa Fort<br>Tarsor Fort<br>Gurgaon Fort<br>Nipania, XIII<br>Parbatpur                                                                                   | 21 1 23<br>21 33 14<br>31 24 57<br>79 43 0<br>95 23 46<br>119 34 48<br>128 37 27<br>167 23 40<br>182 48 27<br>214 46 1<br>255 47 26<br>261 25 11<br>311 56 39                                                                        | 153<br>155<br>142<br>161<br>162<br>163<br>172<br>143<br>175<br>173<br>169<br>142<br>144                        | GURA, XI<br>Gokulphára, X<br>Airo Fort<br>Muhammadabad<br>Bargaon Building<br>Himilia<br>Orai Temple<br>Garar Mound (lamp)<br>Kanwa, XII<br>Karnar<br>Atária<br>Banha Fort<br>Chamári<br>Nipania, XIII<br>Áta<br>Sandi Fort<br>Kálpi<br>Parásan Temple<br>Parásan Fort<br>Baukhar<br>Phára, IX | 50 55 56 05<br>53 40 32<br>73 40 47<br>88 14 53<br>94 25 36<br>103 51 40<br>108 6 40<br>112 32 55 04<br>151 10 6<br>158 40 5<br>171 50 29<br>180 32 54<br>185 31 40 35<br>206 28 38<br>215 31 50<br>224 48 40<br>281 24 9<br>283 16 56<br>339 26 53<br>339 45 54 23 | 11<br>121<br>117<br>124<br>116<br>132<br>127<br>12<br>134<br>114<br>139<br>138<br>13<br>130<br>136<br>141<br>122<br>131<br>119<br>11 |
| FATEHGANJ, XXXI<br>Aliganj Building<br>Ismaelpur House (lamp)<br>Sísgarh, X*<br>Atária, XI*<br>Gajnera, XXX<br>Bareilly House<br>Bareilly Kachahri<br>Unchagaon<br>Janjiri, XXIX | 23 7 11<br>25 37 13<br>180 33 55 60<br>233 51 49 60<br>292 53 1 30<br>317 1 28<br>320 1 8<br>334 35 26<br>343 18 2 59                | 354<br>348<br>34<br>33<br>32<br>353<br>352<br>349<br>32        | GOKULPHARA, X<br>Garvai Fort<br>Koratha Temple<br>Sagauli Temple<br>Badarwára<br>Dakoli Temple<br>Perona Fort<br>Kalra<br>Chirauli Fort<br>Sayyidnagar Temple<br>Kanwa, XII<br>Himilia<br>Kotra Temple<br>Gura, XI<br>Phára, IX<br>Revábarti Temple<br>Kacher Hill Mark<br>Dhanora Temple<br>Nágónáth, VIII | 42 27 5<br>49 3 42<br>66 38 47<br>81 37 11<br>107 35 27<br>125 58 54<br>140 33 25<br>159 6 53<br>161 8 28<br>177 40 8 83<br>197 1 57<br>202 49 1<br>230 48 46 75<br>282 0 38 23<br>324 50 28<br>332 56 5<br>351 11 56<br>352 0 49 11 | 101<br>103<br>102<br>100<br>105<br>112<br>111<br>109<br>108<br>12<br>115<br>107<br>11<br>96<br>99<br>104<br>10 | GURI, XXV<br>Pothári, XXIII<br>Saipur, XXVII<br>Dháká, XXVI<br>Jalálabad<br>Mau, XXIV<br>Roshanabad House<br>Shamsabad                                                                                                                                                                         | 4 9 28 88<br>174 29 9 01<br>249 11 32 04<br>253 54 40<br>308 15 10 51<br>350 29 4<br>359 43 10                                                                                                                                                                      | 26<br>28<br>27<br>338<br>26<br>336<br>337                                                                                            |
| GANDASPUR, XV<br>Nipania, XIII<br>Husapura, XIV<br>Auraiya<br>Kakoto Temple<br>Parin Fort Mark (lamp)<br>Atsu, XVI<br>Baradána Fort<br>Seod<br>Seontára, XVII<br>Sikandra        | 1 40 58 11<br>65 59 41 28<br>83 37 20<br>99 25 19<br>104 42 42<br>117 15 52 44<br>158 29 17<br>166 4 20<br>178 37 17 16<br>345 13 27 | 15<br>15<br>185<br>201<br>203<br>16<br>190<br>200<br>17<br>178 | GOPALPUR h.s.<br>Bila<br>Chandla, III                                                                                                                                                                                                                                                                       | h.s.<br>128 1 43<br>177 53 19                                                                                                                                                                                                        | 53<br>53                                                                                                       | HASRI h.s.<br>Bannora Fort<br>Dálipur, II<br>Hardua Tree<br>Sháhgarh Fort                                                                                                                                                                                                                      | 165 56 7<br>214 33 51<br>307 45 6<br>359 24 26                                                                                                                                                                                                                      | 48<br>46<br>46<br>47                                                                                                                 |
| GANGAWARA S.<br>Sámán<br>Mainpuri, Court House<br>Bisungarh, XX                                                                                                                  | 20 27 24<br>101 34 12<br>301 44 7                                                                                                    | 320<br>321<br>320                                              | GUARI t.s.<br>Atsu, XVI<br>Chachhúnd Fort<br>Barsan<br>Gasáro Fort<br>Biróna, XVIII<br>Kudarkot Temple<br>Sumáin Fort<br>Barhind Fort<br>Ruru (Chhota) Old Fort<br>Bidhúna<br>Ruru (Bara) Fort<br>Sahár Fort<br>Seod                                                                                        | 19 41 33<br>37 38 1<br>48 29 21<br>69 28 51<br>160 53 22<br>169 45 44<br>187 5 56<br>203 9 23<br>216 52 14<br>235 10 42<br>247 7 13<br>262 16 5<br>314 44 17                                                                         | 211<br>212<br>211<br>214<br>210<br>221<br>222<br>226<br>220<br>209<br>219<br>217<br>209                        | HIMILIA S.<br>Gokulphára, X<br>Girthan Fort<br>Dantoli Temple<br>Kanwa, XII<br>Urgaon Temple<br>Kukargaon Building<br>Atária<br>Gura, XI<br>Rinia Building<br>Muhammadabad<br>Bargaon Building<br>HUSAPURA, XIV<br>Kanwa, XII<br>Jagamanpur Fort                                               | 17 3 52<br>29 16 37<br>133 12 37<br>140 2 31<br>191 31 41<br>200 31 57<br>231 1 53<br>274 20 22<br>284 19 55<br>297 40 23<br>306 10 10<br>7 31 47 13<br>115 7 10                                                                                                    | 115<br>120<br>128<br>115<br>151<br>140<br>118<br>116<br>125<br>118<br>123                                                            |
| GARA SANDNA h.s.<br>Mukána Hill Mark<br>Karri<br>Thanela, VI<br>Putli Bakoára<br>Pai Temple                                                                                      | 4 39 12<br>127 6 42<br>162 8 36<br>186 32 53<br>234 37 3                                                                             | 83<br>81<br>82<br>81<br>84                                     |                                                                                                                                                                                                                                                                                                             | h.s.<br>h.s.<br>h.s.<br>h.s.                                                                                                                                                                                                         |                                                                                                                |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                     | 14<br>194                                                                                                                            |

\* Of the North-East Longitudinal Series.

| Name of station with azimuths of surrounding points                                                                                                                                                                                                  | No. of triangle giving distance                                                                                                                                                    | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                                                | No. of triangle giving distance                                                      | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                                               | No. of triangle giving distance                                                                                                                                                                                                                                            | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                                               | No. of triangle giving distance                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HUSAPURA, XIV<br>Bareh Temple<br>Bareh Fort<br>Tiar Fort<br>Atsu, XVI<br>Yani<br>Nabada Fort<br>Bason Fort<br>Gandasapur, XV<br>Kuthaund Fort<br>Kuthaund Temple<br>Nipania, XIII<br>Tarsor Fort<br>Gijnor                                           | 155 11 53<br>156 0 24<br>182 27 20<br>188 2 31 20<br>194 11 12<br>200 35 49<br>211 2 23<br>245 52 11 43<br>268 10 47<br>270 25 32<br>298 59 39 40<br>315 58 19<br>s. 347 22 34     | KALSAN, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 191<br>198<br>196<br>16<br>192<br>197<br>195<br>15<br>177<br>176<br>14<br>174<br>143 | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 47 36 11<br>s. 60 0 16<br>65 34 45<br>67 40 13 47<br>113 32 50<br>126 58 23 68<br>s. 171 18 50<br>181 9 46 62<br>216 24 28<br>265 53 42<br>296 22 12<br>308 59 17<br>320 30 33<br>322 31 19<br>327 0 55<br>331 31 35<br>334 23 28<br>s. 342 46 57<br>345 19 45<br>350 35 7 | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 225<br>229<br>233<br>19<br>280<br>20<br>273<br>21<br>275<br>278<br>259<br>258<br>272<br>249<br>253<br>286<br>264<br>234<br>247<br>244                                       |
| JALALABAD, S.<br>Guri, XXV<br>Ekri House (lamp)<br>Bodona<br>Dhaka, XXVI<br>Man, XXIV                                                                                                                                                                | 74 0 47<br>95 33 17<br>151 6 59<br>220 43 22<br>356 19 46                                                                                                                          | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi  | 338<br>341<br>341<br>339<br>338                                                      | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 47 36 11<br>s. 60 0 16<br>65 34 45<br>67 40 13 47<br>113 32 50<br>126 58 23 68<br>s. 171 18 50<br>181 9 46 62<br>216 24 28<br>265 53 42<br>296 22 12<br>308 59 17<br>320 30 33<br>322 31 19<br>327 0 55<br>331 31 35<br>334 23 28<br>s. 342 46 57<br>345 19 45<br>350 35 7 | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 334<br>29<br>343<br>345<br>30<br>346<br>31<br>29                                                                                                                            |
| JANJIRI, XXIX<br>Ismaulpur House (lamp)<br>Aliganj Building<br>Fatehganj, XXXI<br>Unchagaon<br>Bareilly House<br>Bareilly Kachahri<br>Parbata<br>Gajnera, XXX<br>Faridpur Thana<br>Kasrak, XXVIII<br>Khera Bajhera<br>Dilwari Mound<br>Saipur, XXVII | 131 39 22<br>140 2 15<br>163 20 42 67<br>s. 170 11 50<br>179 37 17<br>187 11 16<br>219 4 28<br>233 56 15 54<br>258 12 50<br>298 33 36 55<br>320 48 34<br>358 48 11<br>358 48 37 09 | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi  | 348<br>354<br>32<br>350<br>353<br>352<br>351<br>31<br>347<br>30<br>343<br>345<br>30  | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 47 36 11<br>s. 60 0 16<br>65 34 45<br>67 40 13 47<br>113 32 50<br>126 58 23 68<br>s. 171 18 50<br>181 9 46 62<br>216 24 28<br>265 53 42<br>296 22 12<br>308 59 17<br>320 30 33<br>322 31 19<br>327 0 55<br>331 31 35<br>334 23 28<br>s. 342 46 57<br>345 19 45<br>350 35 7 | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 343<br>343<br>344                                                                                                                                                           |
| KALPI, S.<br>Gura, XI<br>Nipania, XIII<br>Duhelkhand                                                                                                                                                                                                 | 44 53 36<br>123 28 55<br>s. 128 53 12                                                                                                                                              | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi  | 141<br>141<br>164                                                                    | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 47 36 11<br>s. 60 0 16<br>65 34 45<br>67 40 13 47<br>113 32 50<br>126 58 23 68<br>s. 171 18 50<br>181 9 46 62<br>216 24 28<br>265 53 42<br>296 22 12<br>308 59 17<br>320 30 33<br>322 31 19<br>327 0 55<br>331 31 35<br>334 23 28<br>s. 342 46 57<br>345 19 45<br>350 35 7 | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 303<br>301<br>293<br>302<br>307<br>308<br>311<br>312<br>316<br>290<br>313<br>317<br>315<br>319<br>318<br>310<br>314<br>309<br>289<br>305<br>289<br>299<br>300<br>294<br>296 |
| KALRA, h.s.<br>Badarwara<br>Gokulphara, X                                                                                                                                                                                                            | h.s.<br>20 35 22<br>320 31 31                                                                                                                                                      | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi  | 111<br>111                                                                           | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 47 36 11<br>s. 60 0 16<br>65 34 45<br>67 40 13 47<br>113 32 50<br>126 58 23 68<br>s. 171 18 50<br>181 9 46 62<br>216 24 28<br>265 53 42<br>296 22 12<br>308 59 17<br>320 30 33<br>322 31 19<br>327 0 55<br>331 31 35<br>334 23 28<br>s. 342 46 57<br>345 19 45<br>350 35 7 | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 309<br>289<br>305<br>289<br>299<br>300<br>294<br>296                                                                                                                        |
| KALSA, XIX<br>Gaili Fort<br>Siriao Fort<br>Seontara, XVII<br>Kursi<br>Jaraun Fort<br>Bidhna                                                                                                                                                          | 3 50 22<br>6 34 40<br>10 49 31 55<br>s. 18 0 53<br>22 20 3<br>36 53 32                                                                                                             | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi  | 256<br>250<br>19<br>237<br>231<br>207                                                | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 47 36 11<br>s. 60 0 16<br>65 34 45<br>67 40 13 47<br>113 32 50<br>126 58 23 68<br>s. 171 18 50<br>181 9 46 62<br>216 24 28<br>265 53 42<br>296 22 12<br>308 59 17<br>320 30 33<br>322 31 19<br>327 0 55<br>331 31 35<br>334 23 28<br>s. 342 46 57<br>345 19 45<br>350 35 7 | KALSA, XIX<br>Sabhad Fort<br>Airo<br>Haseran Fort<br>Birona, XVIII<br>Rausen Fort (lamp)<br>Bisungarh, XX<br>Rauli<br>Chandanpur, XXI<br>Amolar<br>Tirwa Temple<br>Benora<br>Indargarh Fort<br>Majelo Fort<br>Sirsai Fort<br>Abath Mound<br>Khanpur Fort<br>Bhadora Temple<br>Akupu<br>Bela Fort Mark<br>Malhausi | 289<br>305<br>289<br>299<br>300<br>294<br>296                                                                                                                               |

| Name of station with azimuths of surrounding points                                                                                                                                                                                                           | No. of triangle giving distance                                                                                                                                                                                            | Name of station with azimuths of surrounding points                                                                                                                                   | No. of triangle giving distance                                                                | Name of station with azimuths of surrounding points                                                                                                                                   | No. of triangle giving distance                                                                | Name of station with azimuths of surrounding points                                                                                                                                   | No. of triangle giving distance                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| KURSI s.<br>Kalsán, XIX<br>Mau Building<br>Gali Fort<br>Siráo Fort<br>Bhadora Fort<br>Abath Mound<br>Khanpur Fort<br>Auser Fort<br>Malhausi<br>Akupu                                                                                                          | 197 59 24<br>212 50 30<br>218 39 14<br>223 18 2<br>237 3 33<br>244 12 22<br>258 14 24<br>269 13 18<br>273 53 8<br>291 3 3                                                                                                  | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 237<br>257<br>255<br>251<br>252<br>253<br>238<br>263<br>244<br>237                             | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 237<br>257<br>255<br>251<br>252<br>253<br>238<br>263<br>244<br>237                             | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 237<br>257<br>255<br>251<br>252<br>253<br>238<br>263<br>244<br>237                             |
| KUSMAR, I<br>Semra Fort<br>Tinsmál, VII†<br>Baksua<br>Niwar Tiled Building<br>Bakarua<br>Baksua Fort<br>Baksua Temple<br>Mangrai Building<br>Hardua Tree<br>Dálipur, II<br>Bila<br>Pola<br>Chandla, III<br>Gadakhár<br>Bádsháhpur<br>Bia Barari<br>Rangir, X† | 36 57 56<br>68 22 47 71<br>h.s.<br>h.s.<br>89 40 15<br>97 22 51<br>98 4 55<br>100 31 45<br>128 12 55<br>140 16 36 97<br>h.s.<br>189 54 12<br>193 6 17<br>196 7 50 52<br>238 53 6<br>240 48 48<br>269 19 23<br>340 23 21 86 | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 38<br>1<br>37<br>36<br>39<br>40<br>41<br>42<br>44<br>2<br>50<br>55<br>3<br>51<br>52<br>43<br>1 | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 38<br>1<br>37<br>36<br>39<br>40<br>41<br>42<br>44<br>2<br>50<br>55<br>3<br>51<br>52<br>43<br>1 | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 38<br>1<br>37<br>36<br>39<br>40<br>41<br>42<br>44<br>2<br>50<br>55<br>3<br>51<br>52<br>43<br>1 |
| MAHAUSI s.<br>Kursi<br>Mau Building<br>Kalsán, XIX<br>Bhadora Fort<br>Orokki Fort<br>Akupu                                                                                                                                                                    | 93 55 24<br>163 40 54<br>170 35 54<br>176 36 44<br>286 41 11<br>317 23 11                                                                                                                                                  | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 244<br>257<br>244<br>252<br>246<br>245                                                         | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 244<br>257<br>244<br>252<br>246<br>245                                                         | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 244<br>257<br>244<br>252<br>246<br>245                                                         |
| MANANG, VII<br>Seyah<br>Datiára, V<br>Nágonáth, VIII<br>Phára, IX<br>Charkhári Fort<br>Malka Temple<br>Thanela, VI                                                                                                                                            | 10 12 5<br>59 34 23 37<br>114 26 34 88<br>174 8 57 05<br>197 8 47<br>346 15 7<br>354 55 27 66                                                                                                                              | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 76<br>7<br>8<br>9<br>91<br>90<br>7                                                             | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 76<br>7<br>8<br>9<br>91<br>90<br>7                                                             | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 76<br>7<br>8<br>9<br>91<br>90<br>7                                                             |
| MANTAGARH h.s.<br>Bánsparh<br>Chandla, III<br>Thanela, VI                                                                                                                                                                                                     | 62 14 8<br>76 40 13<br>146 21 43                                                                                                                                                                                           | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 66<br>67<br>66                                                                                 | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 66<br>67<br>66                                                                                 | MAU, XXIV<br>Chandanpur, XXI<br>Fategarh Church<br>Farukhabad Palace<br>Farukhabad Temple<br>Pothári, XXIII<br>Roshanabad House<br>Shamsabad<br>Guri, XXV<br>Jalálabad<br>Dháka, XXVI | 66<br>67<br>66                                                                                 |

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

| Name of station with azimuths of surrounding points                                                                                                                                                                     | No. of triangle giving distance                                                                                                                                    | Name of station with azimuths of surrounding points                                                                                                                     | No. of triangle giving distance                                                                                                                                                              | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                       | No. of triangle giving distance                                                                          | Name of station with azimuths of surrounding points           | No. of triangle giving distance |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------|
| PATHARIA h.s.<br>Tinsmál, VII†<br>Katora Tiled Building                                                                                                                                                                 | 144 24 25<br>157 2 11                                                                                                                                              | SATPUR, XXVII<br>Janjiri, XXIX<br>Kasrak, XXVIII<br>Bodona<br>Dhaka, XXVI<br>Guri, XXV                                                                                  | 35<br>35<br>35<br>92<br>9                                                                                                                                                                    | SEONTARA, XVII<br>Seod<br>Phaphand Building<br>Atsu, XVI<br>Harchandpur Fort<br>Lakna Fort<br>Birona, XVIII<br>Bidhuna<br>Kalsán, XIX<br>Bela Fort Mark<br>Aneso Fort<br>Khánpur Fort<br>Jiwa Sirsani Fort<br>Akupu<br>Dabkari Temple<br>Ponti Fort<br>Nandu Sahál Fort<br>Gandasapur, XV | 199<br>204<br>17<br>213<br>216<br>18<br>208<br>19<br>247<br>242<br>235<br>239<br>234<br>206<br>205<br>17 | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari | 76<br>76<br>77<br>78            |
| PHARA, IX<br>Tirah Shergarh<br>Nágonáth, VIII<br>Mardángab Temple<br>Bewábarti Temple<br>Gokulphára, X<br>Gura, XI<br>Charkhari Fort<br>Manang, VII                                                                     | h.s.<br>43 14 10<br>52 19 1 67<br>62 9 15<br>72 38 59<br>102 10 40 85<br>159 48 50 32<br>345 1 37<br>354 7 47 98                                                   | SEOD s.<br>Kakoto Temple<br>Parín Fort Mark (lamp)<br>Atsu, XVI<br>Guári<br>Bidhuna<br>Sahár Fort<br>Seontára, XVII<br>Ponti Fort<br>Nandu Sahál Fort<br>Gandasapur, XV | 30<br>29<br>340<br>28<br>28<br>285<br>287<br>285<br>286<br>307<br>302<br>292<br>311<br>308<br>312<br>316<br>321<br>320<br>319<br>317<br>284<br>318<br>315<br>285<br>313<br>284<br>290<br>291 | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari                                                                                                                                                                                                                             | 76<br>76<br>77<br>78                                                                                     | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari | 76<br>76<br>77<br>78            |
| POLA h.s.<br>Kusmár, I<br>Dálpur, II<br>Chandla, III                                                                                                                                                                    | 13 7 45<br>83 57 11<br>200 59 36                                                                                                                                   | SAMRA h.s.<br>Chandla, III<br>Bansparh<br>Sonha                                                                                                                         | 55<br>54<br>54                                                                                                                                                                               | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari                                                                                                                                                                                                                             | 76<br>76<br>77<br>78                                                                                     | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari | 76<br>76<br>77<br>78            |
| POTHARI, XXIII<br>Bisungarh, XX<br>Navábganj<br>Guri, XXV<br>Roshanabad House<br>Man, XXIV<br>Farrukhabad Temple<br>Farrukhabad Palace<br>Fategarh Church<br>Chandanpur, XXI<br>Barkhera<br>Mando<br>Muhammadabad, XXII | 0 18 57 50<br>169 21 40<br>184 8 51 07<br>204 29 50<br>243 45 22 50<br>265 28 21<br>266 9 10<br>276 23 10<br>307 30 13 20<br>307 31 44<br>334 10 35<br>352 4 30 53 | SEOD s.<br>Kakoto Temple<br>Parín Fort Mark (lamp)<br>Atsu, XVI<br>Guári<br>Bidhuna<br>Sahár Fort<br>Seontára, XVII<br>Ponti Fort<br>Nandu Sahál Fort<br>Gandasapur, XV | 24<br>334<br>26<br>335<br>25<br>330<br>332<br>338<br>23<br>332<br>326<br>23                                                                                                                  | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari                                                                                                                                                                                                                             | 76<br>76<br>77<br>78                                                                                     | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari | 76<br>76<br>77<br>78            |
| POTLI BAKOARA h.s.<br>Gara Sandna<br>Kari<br>Thanela, VI<br>Mankahri House<br>Pai Temple                                                                                                                                | h.s.<br>6 33 19<br>38 48 29<br>89 22 29<br>142 28 44<br>313 33 34                                                                                                  | SANRA h.s.<br>Chandla, III<br>Bansparh<br>Sonha                                                                                                                         | 81<br>80<br>80<br>86<br>84                                                                                                                                                                   | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari                                                                                                                                                                                                                             | 76<br>76<br>77<br>78                                                                                     | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari | 76<br>76<br>77<br>78            |
| RANGIR, X†<br>Tinsmál, VIII†<br>Kusmár, I<br>Bia Barari                                                                                                                                                                 | 106 1 22 39<br>160 25 38 91<br>h.s. 186 50 19                                                                                                                      | SEOD s.<br>Kakoto Temple<br>Parín Fort Mark (lamp)<br>Atsu, XVI<br>Guári<br>Bidhuna<br>Sahár Fort<br>Seontára, XVII<br>Ponti Fort<br>Nandu Sahál Fort<br>Gandasapur, XV | 1<br>1<br>43                                                                                                                                                                                 | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari                                                                                                                                                                                                                             | 76<br>76<br>77<br>78                                                                                     | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari | 76<br>76<br>77<br>78            |
| RAULI s.<br>Kasáve Building (lamp)<br>Bisungarh, XX<br>Chandanpur, XXI<br>Amolar<br>Kalsán, XIX                                                                                                                         | 55 4 15<br>86 58 41<br>195 55 5<br>317 22 24<br>351 18 4                                                                                                           | SEOD s.<br>Kakoto Temple<br>Parín Fort Mark (lamp)<br>Atsu, XVI<br>Guári<br>Bidhuna<br>Sahár Fort<br>Seontára, XVII<br>Ponti Fort<br>Nandu Sahál Fort<br>Gandasapur, XV | 282<br>273<br>274<br>276<br>273                                                                                                                                                              | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari                                                                                                                                                                                                                             | 76<br>76<br>77<br>78                                                                                     | SEYAH h.s.<br>Datára, V<br>Manang, VII<br>Thanela, VI<br>Kari | 76<br>76<br>77<br>78            |

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral. \* Of the North-East Longitudinal Series.

| Name of station with azimuths of surrounding points                                                                                                                                             | No. of triangle giving distance                                                                                                                                         | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                 | No. of triangle giving distance                              | Name of station with azimuths of surrounding points                                                                                                                             | No. of triangle giving distance                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| SONHA h.s.<br>Sára<br>Bánsparh<br>Tálgao Hill Mark                                                                                                                                              | h.s. 51 59 3<br>" 142 58 58<br>259 6 3                                                                                                                                  | THANELA, VI<br>Maniagarh<br>Gara Sandna                                                                                                                                                                                                                                             | 64<br>64<br>65                                               | h.s. 326 17 6<br>" 342 7 24                                                                                                                                                     | 66<br>82                                                                                     |
| THANELA, VI<br>Bánsparh<br>Karri<br>Tilona Temple<br>Chandla, III<br>Chhatarpur Temple<br>Datiára, V<br>Seyah<br>Lughasi Fort<br>Manang, VII<br>Malka Temple<br>Mankahri House<br>Putli Bakoára | h.s. 0 23 43<br>" 9 7 10<br>15 41 30<br>37 15 29 07<br>69 19 30<br>112 25 36 20<br>h.s. 119 1 47<br>125 56 32<br>174 56 16 26<br>182 5 53<br>211 37 6<br>h.s. 269 20 51 | TINSMAL, VII†<br>Dálipur, II<br>Nivar Tiled Building<br>Bakarua<br>Katora Tiled Building<br>Kusmar, I<br>Rangit, X†<br>Patharia                                                                                                                                                     | 62<br>78<br>85<br>6<br>60<br>6<br>77<br>89<br>90<br>86<br>80 | h.s. 203 53 44 13<br>223 24 40<br>h.s. 229 57 21<br>232 28 6<br>248 14 20 28<br>285 50 40 61<br>" 324 20 14                                                                     | 2<br>36<br>39<br>35<br>1<br>1<br>35                                                          |
|                                                                                                                                                                                                 |                                                                                                                                                                         | TURAH SHERGARH h.s.<br>Gogora Temple<br>Churári Temple<br>UNOHAGAON s.<br>Ismailpur House (lamp)<br>Fatehganj, XXXI<br>Parbata<br>Janjiri, XXIX<br>YANI s.<br>Husapura, XIV<br>Jagamanpur Fort<br>Bareh Temple<br>Bareh Fort<br>Tiar Fort<br>Atsu, XVI<br>Nabada Fort<br>Bason Fort |                                                              | 315 5 51<br>335 54 6<br>77 59 42<br>154 37 13<br>s. 321 18 39<br>350 10 57<br>14 11 56<br>64 31 36<br>112 25 37<br>114 38 26<br>119 41 26<br>183 9 21<br>230 25 26<br>274 11 21 | 94<br>98<br>349<br>349<br>351<br>350<br>192<br>194<br>192<br>198<br>196<br>193<br>197<br>195 |

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

July 1879.

 J. B. N. HENNESSEY,  
In charge of Computing Office.

## RANGIR MERIDIONAL SERIES.

## CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— $\lambda$  stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically,  $H_s$  for the Height when found by spirit leveling, and  $h$  for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of  $\lambda$  and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c.; secondary stations by the letters h.s., t.s. and s. The names in italics are those of the territories, states or districts in which the stations or points are situated.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Abath Mound,<br/>(<i>Farrukhabad</i>) Highest point.<br/>" " "</p> <p><math>\lambda</math> 26 51 20.9<br/>L 79 45 20.3<br/>Nos. 253, 254</p> <p>Agani Fort.<br/>(<i>Etawah</i>)</p> <p><math>\lambda</math> 26 53 58<br/>L 79 19 25<br/>No. 300</p> <p>Airo Fort,<br/>(<i>Jalaun</i>) S. W. corner.</p> <p><math>\lambda</math> 25 55 47.4<br/>L 79 33 19.0<br/>No. 121</p> <p>Airo s.<br/>(<i>Farrukhabad</i>) On highest turret of fort, about 1½ miles N. W. of Ronsa village, 1½ miles E. of Rasulpur and the same distance W.S.W. of the large village of Sakatpur; pargana Sakatpur.</p> <p><math>\lambda</math> 26 53 12.60<br/>L 79 33 28.70<br/>Nos. 228, 229</p> | <p>Akupu s.<br/>(<i>Etawah</i>) On mound close to the village of same name and about 1½ miles S.E. of Piprauli; thána, tahsil and pargana Bidhuna.<br/>" " "</p> <p><math>\lambda</math> 26 45 34.77<br/>L 79 45 7.56<br/>No. 234</p> <p>Aliganj Building,<br/>(<i>Bareilly</i>) Flag.</p> <p><math>\lambda</math> 28 20 24.2<br/>L 79 17 41.0<br/>No. 354</p> <p>Aman Fort,<br/>(<i>Farrukhabad</i>) Highest tower on bastion.</p> <p><math>\lambda</math> 26 50 27.3<br/>L 79 52 3.1<br/>No. 266</p> <p>Amolar s.<br/>(<i>Farrukhabad</i>) On fort about one mile N. by E. of Maugi and 3½ miles E. by S. of Talgram town; thána Tirwa, pargana Thatia-Tirwa.</p> <p><math>\lambda</math> 27 1 45.67<br/>L 79 44 54.31<br/>Nos. 275, 276</p> | <p>Aneso Fort.<br/>(<i>Etawah</i>) On mound.<br/>" " "</p> <p><math>\lambda</math> 26 45 38<br/>L 79 41 23<br/>Nos. 242, 243</p> <p>Āta s.<br/>(<i>Jalaun</i>) On highest building on bastion of fort; thána, tahsil and pargana Āta.</p> <p><math>\lambda</math> 26 2 36.53<br/>L 79 38 53.15<br/>Nos. 129, 130</p> <p>Atária, XI†.<br/>(<i>Vide page 8—K.</i>)</p> <p><math>\lambda</math> 28 38 9.53<br/>L 79 37 42.26<br/><math>H_s</math> 619.32*<br/><math>h</math> 37.8<br/>No. 33</p> <p>Atária s.<br/>(<i>Jalaun</i>) On S.W. bastion of fort; tahsil Āta.</p> <p><math>\lambda</math> 26 4 59.79<br/>L 79 33 0.79<br/>Nos. 113, 114</p> |

\* This height refers to the mark-stone imbedded at 2 feet above the level of the ground, over which the perforated masonry pillar has been built.  
† Of the North-East Longitudinal Series.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Atsara Fort.<br/>(Mainpuri)</p> <p>λ 27 3 2<br/>L 79 15 46<br/>No. 317</p> <p>Atsu, XVI.<br/>(Vide page 6—K.)</p> <p>λ 26 35 17.34<br/>L 79 23 38.51<br/>H 527<br/>h 26*<br/>No. 16</p> <p>Auraiya s.<br/>(Etāwah) In town of the same name about 2 miles S. of Mālipur, the same distance E. of Mānpur, and the same distance N.N.E. of Shergarh police station; thāna, tahsīl and pargana Auraiya.</p> <p>λ 26 27 56.79<br/>L 79 33 2.50<br/>No. 185</p> <p>Auser Fort,<br/>(Farrukhabad) Highest turret.</p> <p>λ 26 48 14.6<br/>L 79 50 16.2<br/>Nos. 262, 263</p> <p>Babai Fort.<br/>(Jālaun)</p> <p>λ 26 10 22<br/>L 79 30 14<br/>No. 158</p> <p>Badarwāra h.s.<br/>(Jhānsi) On a hill about 4 miles N.W. of Daknour village and 6½ miles S.E. of the large village and Customs Post of Irich; thāna and pargana Gursarai, tahsīl Garotha.</p> <p>λ 25 44 42.76<br/>L 79 13 0.42<br/>No. 100</p> <p>Bādshāhpur h.s.<br/>(Damoh) On a hill close to the villages of Gugra, Bankero ruins and Kalkoa.</p> <p>λ 24 22 20.93<br/>L 79 37 43.86<br/>No. 52</p> <p>Bajiri Fort,<br/>(Farrukhabad) Centre of bastion.</p> <p>λ 26 57 48<br/>L 79 28 7</p> | <p>Bakarua h.s.<br/>(Bundelkhand, Panna State) On a hill close to and S.W. of Biusa village in ruins, about 1½ miles W. of Gobindapur and 1 mile N. of Gogra.</p> <p>λ 24 14 41.07<br/>L 79 11 54.39<br/>H 1768<br/>No. 39</p> <p>Baksua Fort,<br/>(Bundelkhand, Panna State) S.W. corner of S.W. turret.</p> <p>λ 24 15 8.7<br/>L 79 19 30.3<br/>No. 40</p> <p>Baksua h.s.<br/>(Bundelkhand, Panna State) On a detached hill about a mile S. of village of that name, close to and S.E. of Bīrgarh and N.W. of Kohi.</p> <p>λ 24 14 11.13<br/>L 79 19 30.60<br/>H 1813<br/>No. 37</p> <p>Baksua Temple.<br/>(Bundelkhand, Panna State) In village.</p> <p>λ 24 15 9.0<br/>L 79 19 45.7<br/>No. 41</p> <p>Bamnora Fort.<br/>(Bundelkhand, Bijāwar State)</p> <p>λ 24 26 17<br/>L 79 9 6<br/>H 1305<br/>No. 48</p> <p>Banha Fort,<br/>(Jālaun) Tree.</p> <p>λ 26 2 0<br/>L 79 35 29<br/>No. 139</p> <p>Banora Fort,<br/>(Jālaun) Flag.</p> <p>λ 26 7 24.6<br/>L 79 30 40.1<br/>No. 149</p> <p>Bansi s.<br/>(Etāwah) About ½ mile N. of the bridge over the Ganges Canal, Etāwah Branch, near Kamara village and midway between Phaphūnd and Achalda Railway Stations; thāna, tahsīl and pargana Phaphūnd.</p> <p>λ 26 42 30<br/>L 79 29 33</p> | <p>Bānsparh h.s.<br/>(Bundelkhand, Bijāwar State) On a hill about 2 miles N. by W. of Pathār and 2½ miles E. by N. of Majgoa village.</p> <p>λ 24 37 27.16<br/>L 79 47 20.36<br/>H 1991<br/>Nos. 61, 62</p> <p>Baradāna Fort.<br/>(Etāwah)</p> <p>λ 26 31 12<br/>L 79 37 10<br/>No. 190</p> <p>Barch Fort.<br/>(Etāwah)</p> <p>λ 26 30 1<br/>L 79 17 24<br/>No. 198</p> <p>Barch Temple,<br/>(Etāwah) Remarkably high.</p> <p>λ 26 29 47.6<br/>L 79 17 21.2<br/>No. 191</p> <p>Bareilly House.<br/>(Bareilly) Diwān Bahādūr Singh's house in city.</p> <p>λ 28 22 13.1<br/>L 79 26 38.2<br/>No. 353</p> <p>Bareilly Kachahri.<br/>(Bareilly)</p> <p>λ 28 20 8.8<br/>L 79 28 2.7<br/>No. 352</p> <p>Bargaon Building.<br/>(Jālaun) On N.E. bastion of fort in village.</p> <p>λ 25 57 23.9<br/>L 79 25 50.8<br/>Nos. 123, 124</p> <p>Barhind Fort,<br/>(Etāwah) N.W. bastion.</p> <p>λ 26 52 56.0<br/>L 79 31 21.4<br/>Nos. 226, 227</p> <p>Bari Matāna Mound,<br/>(Shāhjāhpur) Flag.</p> <p>λ 27 52 56<br/>L 79 43 37<br/>No. 342</p> |

\* Above the level of the elevated platform on which the station is placed.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                 | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                      | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Barkhera s.</b><br><i>(Farrukhabad)</i> On mound about 1 mile S.E. of Kanjhana, same distance N.E. of Hismápur and 1½ miles W. by N. of Jalápur on road from Yákútganj to Ohhibramau town; pargana Bhojpur.<br>$\lambda$ 27 17 28.85<br>$L$ 79 35 47.59<br>Nos. 322, 323 | <b>Benora s.</b><br><i>(Farrukhabad)</i> On fort about 1½ miles S.W. of Til-sara, 1½ miles S.E. of Firozpur and 2 miles N.E. of Koerna village; pargana Thatia-Tirwa.<br>$\lambda$ 26 53 35.59<br>$L$ 79 49 9.94<br>Nos. 259, 260                                                                                                | <b>Bidhúna s.</b><br><i>(Etáwáh)</i> On highest turret of fort in the large village of that name, thána, tahsil and pargana Bidhúna.<br>$\lambda$ 26 48 10.70<br>$L$ 79 33 36.27<br>Nos. 207, 208                                         |
| <b>Baro Fort,</b><br><i>(Etáwáh)</i> Bastion.<br>$\lambda$ 26 55 28.5<br>$L$ 79 12 56.2<br>No. 307                                                                                                                                                                          | <b>Ber s.</b><br><i>(Etáwáh)</i> On building on mound close to the Ganges Canal, Etáwáh Branch, about 3½ miles W.N.W. of Ramáin and 1½ miles S.S.W. of Kura village; thána, tahsil and pargana Bhārthna.<br>$\lambda$ 26 48 38.25<br>$L$ 79 14 16.36<br>No. 291                                                                  | <b>Bijáwar Palace.</b><br><i>(Bundelkhand, Bijáwar State)</i> N. corner of highest turret.<br>$\lambda$ 24 37 27.9<br>$L$ 79 32 5.6<br>$H$ 1237<br>No. 71                                                                                 |
| <b>Barsan s.</b><br><i>(Etáwáh)</i> On S. side of the road from Phaphúnd to Etáwáh, about ¾ mile S.W. of Indrapur and ¼ mile N.E. of Indrakú; tahsil Bhārthna.<br>$\lambda$ 26 38 58.07<br>$L$ 79 20 38.39<br>No. 211                                                       | <b>Bhadaura Fort.</b><br><i>(Etáwáh)</i><br>$\lambda$ 26 50 54<br>$L$ 79 42 39<br>No. 252                                                                                                                                                                                                                                        | <b>Bijáwar Temple,</b><br><i>(Bundelkhand, Bijáwar State)</i> New.<br>$\lambda$ 24 37 46.5<br>$L$ 79 32 5.7<br>$H$ 1195<br>No. 70                                                                                                         |
| <b>Barsen Fort,</b><br><i>(Etáwáh)</i> Tree.<br>$\lambda$ 26 28 1<br>$L$ 79 35 44                                                                                                                                                                                           | <b>Bhadaura Temple.</b><br><i>(Etáwáh)</i><br>$\lambda$ 26 50 10.0<br>$L$ 79 44 52.0<br>Nos. 264, 265                                                                                                                                                                                                                            | <b>Bila h.s.</b><br><i>(Bundelkhand, Bijáwar State)</i> On a hill about 2 miles S.S.E. of Surápur village, 1½ miles N. of Bikanu and 3½ miles S.E. of Kari village.<br>$\lambda$ 24 28 8.98<br>$L$ 79 25 24.52<br>$H$ 1718<br>Nos. 49, 50 |
| <b>Basait Fort,</b><br><i>(Mainpuri)</i> Bastion.<br>$\lambda$ 26 58 53.6<br>$L$ 79 18 56.1<br>No. 310                                                                                                                                                                      | <b>Bhadek s.</b><br><i>(Jálaun)</i> On high pillar close to the right bank of the Jumna, about 1½ miles S.E. of the road from Jálaun to Shergarh Ghát <i>via</i> Kuthaund police station and 3 miles E. of Salámpur; thána Kuthaund, tahsil Jálaun, pargana Bhadek.<br>$\lambda$ 26 22 21.00<br>$L$ 79 31 50.32<br>Nos. 187, 188 | <b>Bina Building,</b><br><i>(Etáwáh)</i> High.<br>$\lambda$ 26 58 24.5<br>$L$ 79 11 45.6<br>No. 311                                                                                                                                       |
| <b>Bason Fort.</b><br><i>(Etáwáh)</i> Square building on N.E. bastion.<br>$\lambda$ 26 27 29.4<br>$L$ 79 25 22.5<br>No. 195                                                                                                                                                 | <b>Bhoraj, IV.</b><br><i>(Vide page 4—K)</i><br>$\lambda$ 24 50 28.71<br>$L$ 79 5 31.72<br>$H$ 1358<br>$h$ Not forthcoming<br>No. 4                                                                                                                                                                                              | <b>Birona, XVIII.</b><br><i>(Vide page 6—K)</i><br>$\lambda$ 26 51 2.33<br>$L$ 79 24 31.35<br>$H$ 542<br>$h$ 23*<br>No. 18                                                                                                                |
| <b>Batiagarh Staircase.</b><br><i>(Damoh)</i><br>$\lambda$ 24 6 48.5<br>$L$ 79 23 29.7<br>See Synoptical Vol. of the Calcutta Longitudinal Series of the South-East Quadrilateral.                                                                                          | <b>Bia Barari h.s.</b><br><i>(Damoh)</i> On a hill close to the village of that name, about 3 miles S.E. of Kanauna, 3½ miles W.N.W. of Chopra and 2 miles N.E. of Bisdo village. A platform marks the station.<br>$\lambda$ 24 14 49.60<br>$L$ 79 30 20.12<br>$H$ 1694<br>No. 43                                                | <b>Bisungarh, XX.</b><br><i>(Vide page 6—K)</i><br>$\lambda$ 27 6 30.27<br>$L$ 79 27 15.21<br>$H_s$ 518.88†<br>$h$ 23.8<br>No. 20                                                                                                         |
| <b>Baukhar s.</b><br><i>(Hamápur)</i> About 4½ miles S.S.W. of Chandaunt police station and 1½ miles W. of the road from Ráth city to Chandaunt village; thána Chandaunt, tahsil and pargana Jalápur.<br>$\lambda$ 25 51 36.66<br>$L$ 79 38 41.54<br>No. 119                |                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                           |
| <b>Bela Fort Mark.</b><br><i>(Etáwáh)</i><br>$\lambda$ 26 49 24.78<br>$L$ 79 43 23.31<br>Nos. 247, 248                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                           |

\* Above the terreplein of the fort on which the tower stands.

† This height refers to the mark-stone imbedded at 1 foot above the level of the ground, over which the perforated masonry column has been built.



| ation, district, description,<br>co-ordinates &c.                                                                                                               | Name of station, district, description,<br>co-ordinates &c.                                                                          | Name of station, district, description,<br>co-ordinates &c.                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| On tree in village close to the left<br>di, about 1½ miles E. of Giridhar-<br>pura N. by E. of Rāmpur and ¾<br>village; thāna and tahsil Jalāla-<br>abad. o ' " | Chhāni Fort,<br>(Jālaun) Building on N.E. bastion.<br>o ' "<br>λ 26 18 10.3<br>L 79 29 35.7<br>No. 182                               | Dantoli Temple.<br>(Jālaun) In fort.<br>o ' "<br>λ 26 1 52.9<br>L 79 20 11.2<br>No. 128                  |
| 27 51 23.37<br>79 36 55.21<br>No. 340                                                                                                                           | Chhatarpur Temple.<br>(Bundelkhand, Chhatarpur State) On hill.<br>λ 24 54 21.0<br>L 79 37 12.2<br>H 1198<br>Nos. 59, 60              | Datiāra, V.<br>(Vide page 4—K.)<br>λ 25 6 22.21<br>L 79 24 52.04<br>H 1151<br>h Not forthcoming<br>No. 5 |
| t.<br>26 41 36<br>79 24 58<br>No. 212                                                                                                                           | Chhibramau Thāna,<br>(Farrukhabad) Flag.<br>λ 27 8 56.3<br>L 79 32 9.3<br>Nos. 324, 325                                              | Degaon Fort,<br>(Jālaun) Bungalow.<br>λ 26 9 2.6<br>L 79 29 53.5<br>No. 156                              |
| N.E. bastion, about 5½ miles N.<br>26 12 4.2<br>79 18 54.7<br>No. 162                                                                                           | Chirauli Fort.<br>(Jālaun) About 4 miles S. by W. of the large vil-<br>lage of Ait.<br>λ 25 50 18.5<br>L 79 17 47.6<br>Nos. 109, 110 | Deokali Temple.<br>(Etāwah)<br>λ 26 25 52.1<br>L 79 32 9.7<br>No. 186                                    |
| 3½ miles S.W. of Āta village, 1½<br>in village and 1½ miles N. by W.<br>tahsil and pargana Āta.<br>26 1 14.98<br>79 36 12.66<br>No. 138                         | Churāri Temple.<br>(Bundelkhand, Naigawan Ribai Jāgr) On hill.<br>λ 25 19 21.2<br>L 79 35 41.4<br>No. 93                             | Dhāka, XXVI.<br>(Vide page 7—K.)<br>λ 27 44 58.41<br>L 79 43 25.73<br>H 535<br>h 38<br>No. 27            |
| XI.<br>27 13 33.73<br>79 41 29.81<br>508<br>38<br>No. 21                                                                                                        | Churki Fort.<br>(Jālaun) Close to and E. of the village of that<br>name.<br>λ 26 9 1.4<br>L 79 33 40.8<br>No. 157                    | Dhanora Temple.<br>(Jhānsi)<br>λ 25 43 45.8<br>L 79 20 5.2<br>No. 104                                    |
| 24 36 33.38<br>79 29 45.12<br>1796<br>Not forthcoming<br>No. 3                                                                                                  | Dabkari Temple.<br>(Etāwah) On mound.<br>λ 26 43 52.5<br>L 79 43 36.7<br>Nos. 240, 241                                               | Dhasān River Temple.<br>(Bundelkhand, Orchha State)<br>λ 24 42 50.5<br>L 79 17 28.2<br>H 1381<br>No. 58  |
| erklāri State) White temple on<br>25 24 14.2<br>79 47 53.0<br>No. 91                                                                                            | Dakoli Temple.<br>(Jhānsi) On hill immediately W. of village of the<br>same name.<br>λ 25 48 12.4<br>L 79 10 44.0<br>Nos. 105, 106   | Dig Fort,<br>(Etāwah) Highest building.<br>λ 26 54 24.9<br>L 79 16 48.6<br>No. 303                       |
| out 2½ miles S.E. of Gurgaon<br>26 10 38.4<br>79 28 56.1<br>No. 159                                                                                             | Dālīpur, II.<br>(Vide page 4—K.)<br>λ 24 26 57.43<br>L 79 11 45.87<br>H 1599<br>h Not forthcoming<br>No. 2                           |                                                                                                          |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                             | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                   | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Dilwári Mound,<br/>(Budaun) Flag.</p> <p>λ 28 2 47<br/>L 79 26 55<br/>Nos. 345</p>                                                                                                                                                                   | <p>Farrukhabad Temple.<br/>(Farrukhabad) At Mau Gate of city.</p> <p>λ 27 23 51·9<br/>L 79 35 46·9<br/>Nos. 330, 331</p>                                                                                                                                      | <p>Garar Mound (lamp).<br/>(Jálaun) On high building.</p> <p>λ 26 0 53·10<br/>L 79 25 20·28<br/>Nos. 126, 127</p>                                                                                                                 |
| <p>Dipkai h.s.<br/>(Jhānsi) On a hill close to the village about 1½ miles S.W. of Rámpura village and 3 miles E. of Bangra; thána, tahsil and pargana Garotha.</p> <p>λ 25 31 15<br/>L 79 20 35</p>                                                     | <p>Fatehganj, XXXI.<br/>(Vide page 8—K.)</p> <p>λ 28 27 28·69<br/>L 79 21 5·87<br/>H<sub>s</sub> 572·12*<br/>h 37·9<br/>No. 32</p>                                                                                                                            | <p>Gara Sandna h.s.<br/>(Bundelkhand, Chhatarpur State) On a detached hill close to the villages of Gara and Sandna, about a mile W. of Hatwa and 2½ miles E. of Pára.</p> <p>λ 24 49 48·28<br/>L 79 50 21·21<br/>Nos. 81, 82</p> |
| <p>Dorápur Building.<br/>(Etáwáh)</p> <p>λ 26 47 40<br/>L 79 35 42</p>                                                                                                                                                                                  | <p>Fatehgarh Church.<br/>(Farrukhabad)</p> <p>λ 27 21 58·8<br/>L 79 40 12·5<br/>Nos. 328, 329</p>                                                                                                                                                             | <p>Garotha Temple.<br/>(Jhānsi)</p> <p>λ 25 34 9<br/>L 79 20 39</p>                                                                                                                                                               |
| <p>Dorona s.<br/>(Farrukhabad) On fort about a mile W. of Ishwarpur, ½ mile N. of Bijpura and 1½ miles E.S.E. of Baraura village; thána and pargana Sakráwa.</p> <p>λ 26 56 44·57<br/>L 79 23 7·69<br/>Nos. 287, 288</p>                                | <p>Gadakhár h.s.<br/>(Damoh) On a hill about 1½ miles E. of Bori, 2½ miles N.W. of Garwa and 1½ miles S.W. of Nárá-yampur village on the same range of hills.</p> <p>λ 24 19 14·26<br/>L 79 30 58·51<br/>H 1706<br/>No. 51</p>                                | <p>Garwai Fort,<br/>(Jhānsi) Flag.</p> <p>λ 25 41 17<br/>L 79 15 24<br/>No. 101</p>                                                                                                                                               |
| <p>Duhelkhand s.<br/>(Jálaun) On right bank of the Jumna river, about 1½ miles E. of the village of Nipania and same distance N.N.W. of Urkra village; thána Nipania, tahsil Átu, pargana Kálpi.</p> <p>λ 26 12 37·87<br/>L 79 40 47·66<br/>No. 164</p> | <p>Gaili Fort,<br/>(Etáwáh) Temple in haveli.</p> <p>λ 26 51 17·6<br/>L 79 40 41·1<br/>Nos. 255, 256</p>                                                                                                                                                      | <p>Gasáro Fort.<br/>(Etáwáh)</p> <p>λ 26 42 56<br/>L 79 23 30<br/>Nos. 214, 215</p>                                                                                                                                               |
| <p>Ekri House (lamp).<br/>(Sháhjahánpur)</p> <p>λ 27 44 16·57<br/>L 79 31 30·09<br/>No. 341</p>                                                                                                                                                         | <p>Gajnera, XXX.<br/>(Vide page 8—K.)</p> <p>λ 28 20 2·02<br/>L 79 40 58·11<br/>H 631<br/>h 38<br/>No. 31</p>                                                                                                                                                 | <p>Gijnor s.<br/>(Jálaun) Also called Jignor S. on mound, about ¼ mile N.E. of Haripur and 1 mile S. of Biria; thána, tahsil and pargana Jálaun.</p> <p>λ 26 11 38·19<br/>L 79 24 0·42<br/>Nos. 142, 143</p>                      |
| <p>Etáwáh Fort (lamp).<br/>(Etáwáh) At flagstaff on old fort.</p> <p>λ 26 45 34·20<br/>L 79 3 17·75<br/>Nos. 292, 293</p>                                                                                                                               | <p>Gandaspur, XV.<br/>(Vide page 6—K.)</p> <p>λ 26 28 28·98<br/>L 79 38 21·53<br/>H 482<br/>h 28<br/>No. 15</p>                                                                                                                                               | <p>Girthan Fort,<br/>(Jálaun) Flag.</p> <p>λ 25 55 12<br/>L 79 22 5<br/>No. 120</p>                                                                                                                                               |
| <p>Faráidpur Thána,<br/>(Bareilly) Flag.</p> <p>λ 28 12 20·7<br/>L 79 34 44·5<br/>Nos. 346, 347</p>                                                                                                                                                     | <p>Gangawára s.<br/>(Mainpuri) On mound about 2½ miles S.W. of Bewar town, 1½ miles S. of Naya Devi on road from Bewar to Bhongaon town and 2½ miles W. of Ráipur; thána, tahsil and pargana Bhongaon.</p> <p>λ 27 11 32·16<br/>L 79 18 10·28<br/>No. 320</p> | <p>Gogora Temple.<br/>(Hamirpur) On hill.</p> <p>λ 25 25 8·3<br/>L 79 35 24·6<br/>No. 94</p>                                                                                                                                      |
| <p>Farrukhabad Palace,<br/>(Farrukhabad) S.W. turret in fort.</p> <p>λ 27 23 50·4<br/>L 79 36 52·2<br/>Nos. 332, 333</p>                                                                                                                                | <p>Gokulphára, X.<br/>(Vide page 5—K.)</p> <p>λ 25 45 37·06<br/>L 79 19 46·22<br/>H 699<br/>h 12<br/>No. 10</p>                                                                                                                                               |                                                                                                                                                                                                                                   |

\* This height refers to the mark-stone imbedded at 2 feet above the level of the ground, over which the perforated masonry pillar has been built.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                        | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                            | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Gopálpur h.s.<br/>(<i>Bundelkhand, Bijáwar State</i>) On a range of hills running along the left bank of the Chulhi Nadi, about <math>1\frac{1}{2}</math> miles W. of Lakhangon, 2 miles S. of Bainshori and <math>2\frac{1}{2}</math> miles N.E. of Saganui village.</p> <p>o ' "</p> <p>λ 24 24 41·99<br/>L 79 30 13·81<br/>H 1686<br/>No. 53</p>                                                             | <p>Hardua Tree.<br/>(<i>Saugor</i>) Also called Híraghát Tree; flag on hill tree.</p> <p>o ' "</p> <p>λ 24 20 38<br/>L 79 14 44<br/>H 1527<br/>Nos. 44, 45</p>                                                                                                                                                                         | <p>Husapura, XIV.<br/>(<i>Vide page 6—K.</i>)</p> <p>o ' "</p> <p>λ 26 21 42·37<br/>L 79 21 30·43<br/>H 500<br/>h 34<br/>No. 14</p>                                                                                                                                              |
| <p>Guári t.s.<br/>(<i>Etáwáh</i>) About <math>1\frac{1}{2}</math> miles N. from the bridge over the Ganges Canal, Etáwáh Branch, near Achaldá Railway Station, on left bank of the Ahmáya Nadi, about <math>1\frac{1}{2}</math> miles W.N.W. of Khurda and <math>1\frac{1}{2}</math> miles E. of Laituria village; thána, tahsil and pargana Bidhúna.</p> <p>λ 26 44 10·13<br/>L 79 27 10·60<br/>Nos. 209, 210</p> | <p>Haseran Fort,<br/>(<i>Farrukhabad</i>) Bungalow.</p> <p>λ 26 55 31·7<br/>L 79 37 5·3<br/>Nos. 232, 233</p>                                                                                                                                                                                                                          | <p>Indargarh Fort,<br/>(<i>Farrukhabad</i>) High square building.</p> <p>λ 26 55 36·6<br/>L 79 43 16·6<br/>No. 258</p>                                                                                                                                                           |
| <p>Gulganj Fort,<br/>(<i>Bundelkhand, Bijáwar State</i>) S.W. corner.</p> <p>λ 24 41 53·3<br/>L 79 25 2·1<br/>H 1057<br/>No. 73</p>                                                                                                                                                                                                                                                                                | <p>Hasri h.s.<br/>(<i>Saugor</i>) On a small house S. of village, about <math>\frac{1}{2}</math> mile N.W. of Ránpura village which stands on the opposite bank of the stream running between the two villages and 2 miles S. by E. of Bamnora fort.</p> <p>λ 24 24 11·29<br/>L 79 9 40·82<br/>H 1261<br/>No. 46</p>                   | <p>Ismailpur House (lamp).<br/>(<i>Barcilly</i>)</p> <p>λ 28 18 55·96<br/>L 79 16 28·05<br/>No. 348</p>                                                                                                                                                                          |
| <p>Gura, XI.<br/>(<i>Vide page 5—K.</i>)</p> <p>λ 25 57 41·39<br/>L 79 36 10·40<br/>H 477<br/>h 33<br/>No. 11</p>                                                                                                                                                                                                                                                                                                  | <p>Hatta Jail,<br/>(<i>Damoh</i>) S.W. corner.</p> <p>λ 24 7 34<br/>L 79 38 59</p>                                                                                                                                                                                                                                                     | <p>Itaura Temple.<br/>(<i>Jálaun</i>)</p> <p>λ 26 0 55·7<br/>L 79 44 0·6<br/>No. 137</p>                                                                                                                                                                                         |
| <p>Gurgaon Fort,<br/>(<i>Jálaun</i>) Centre.</p> <p>λ 26 12 22·7<br/>L 79 27 15·6<br/>No. 169</p>                                                                                                                                                                                                                                                                                                                  | <p>Hatta, Magistrate's House.<br/>(<i>Damoh</i>)</p> <p>λ 24 7 7<br/>L 79 38 30</p>                                                                                                                                                                                                                                                    | <p>Jagamanpur Fort,<br/>(<i>Jálaun</i>) Temple.</p> <p>λ 26 24 17·4<br/>L 79 15 23·0<br/>No. 194</p>                                                                                                                                                                             |
| <p>Guri, XXV.<br/>(<i>Vide page 7—K.</i>)</p> <p>λ 27 40 0·84<br/>L 79 28 43·22<br/>H 533<br/>h 38<br/>No. 26</p>                                                                                                                                                                                                                                                                                                  | <p>Hatta, N. Temple,<br/>(<i>Damoh</i>) Spire, N. of Jail.</p> <p>λ 24 8 23·33<br/>L 79 38 49·16</p> <p>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p>                                                                                                                                 | <p>Jakha Fort,<br/>(<i>Jálaun</i>) Flag on highest building on S.W. bastion.</p> <p>λ 26 17 41·4<br/>L 79 30 18·1<br/>No. 181</p>                                                                                                                                                |
| <p>Harchandpur Fort.<br/>(<i>Etáwáh</i>)</p> <p>λ 26 42 9<br/>L 79 33 40<br/>No. 213</p>                                                                                                                                                                                                                                                                                                                           | <p>Hatta, S. Temple.<br/>(<i>Damoh</i>)</p> <p>λ 24 7 43·9<br/>L 79 38 25·1</p> <p>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p>                                                                                                                                                      | <p>Jalálabad s.<br/>(<i>Sháhjahánpur</i>) On fort, about <math>\frac{1}{2}</math> mile S.W. of Jalálabad town, 1 mile E. of Pitar Mau village and the same distance N.E. of Ahmednagar; thána and pargana Jalálabd.</p> <p>λ 27 43 23·02<br/>L 79 41 53·43<br/>Nos. 338, 339</p> |
|                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>Himilia s.<br/>(<i>Jálaun</i>) On mound, about <math>1\frac{1}{2}</math> miles S.W. of Usergon, <math>1\frac{1}{2}</math> miles N.E. of Kapási and <math>2\frac{1}{2}</math> miles N. of Kaitheri village on the road Orai to Gursarai; thána, tahsil and pargana Orai.</p> <p>λ 25 58 31·39<br/>L 79 24 8·69<br/>Nos. 115, 116</p> | <p>Jálaun Palace,<br/>(<i>Jálaun</i>) Staircase.</p> <p>λ 26 8 37·7<br/>L 79 22 41·4<br/>No. 155</p>                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                        | <p>Jálaun Temple No. I.<br/>(<i>Jálaun</i>)</p> <p>λ 26 8 33·6<br/>L 79 22 41·8<br/>Nos. 153, 154</p>                                                                                                                                                                            |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Jálaun Temple No. 2,<br/>(Jálaun) Three domed.      ° ' "</p> <p>λ      26 8 50<br/>L      79 22 38</p> <p>Janjiri, XXIX.<br/>(Vide page 8—K.)</p> <p>λ      28 10 52·01<br/>L      79 26 43·30<br/>H      584<br/>h      38<br/>No. 30</p> <p>Jankath Fort,<br/>(Farrukhabad) White building.</p> <p>λ      26 51 27·9<br/>L      79 54 5·1<br/>No. 267</p> <p>Jaraun Fort,<br/>(Etáwal) High bastion.</p> <p>λ      26 52 37·8<br/>L      79 39 2·6<br/>Nos. 230, 231</p> <p>Jatáshankar Fort.<br/>(Damoh) Denoted by a platform.</p> <p>λ      24 13 43·6<br/>L      79 36 5·2</p> <p>See Synoptical Volume of the Calcutta Longitudinal<br/>Series of the South-East Quadrilateral.</p> <p>Jatoli Tower,<br/>(Jálaun) Flag.</p> <p>λ      26 16 21·0<br/>L      79 30 5·9<br/>Nos. 179, 180</p> <p>Jiwa Sirsaini Fort.<br/>(Etáwal)</p> <p>λ      26 44 4<br/>L      79 40 17<br/>No. 239</p> <p>Kacher Hill Mark.<br/>(Jhánsi) On a detached hill immediately W. of the<br/>village of the same name, 2 miles E.N.E. of Hírá-<br/>nagar and 3 miles S.S.E. of the large village of<br/>Kakarbai; thána, tahsil and pargana Garotha.</p> <p>λ      25 39 18·72<br/>L      79 23 19·50<br/>No. 99</p> <p>Kaitwa Fort,<br/>(Jálaun) White building in centre.</p> <p>λ      26 16 40·1<br/>L      79 24 16·8<br/>No. 175</p> | <p>Kakoto Temple.<br/>(Etáwal)      ° ' "</p> <p>λ      26 29 2·2<br/>L      79 34 39·1<br/>Nos. 201, 202</p> <p>Kálpi, Chaurási Temple.<br/>(Jálaun) In ruins.</p> <p>λ      26 6 49·6<br/>L      79 46 9·0<br/>No. 165</p> <p>Kálpi s.<br/>(Jálaun) On fort close to and N. of town of the same<br/>name; thána and pargana Kálpi, tahsil Áta.</p> <p>λ      26 7 51·16<br/>L      79 47 21·98<br/>No. 141</p> <p>Kalra h.s.<br/>(Jálaun) On hill, about 1½ miles S. by E. of Jakoli<br/>on road from Áta to Jhánsi and 1 mile N.E. of Jam-<br/>rahi; thána Ait, tahsil Orai.</p> <p>λ      25 50 26·51<br/>L      79 15 23·00<br/>No. 111</p> <p>Kalsán, XIX.<br/>(Vide page 6—K.)</p> <p>λ      26 57 10·27<br/>L      79 41 7·48<br/>H<sub>s</sub>      501·22*<br/>h      23·1<br/>No. 19</p> <p>Kanwa, XII.<br/>(Vide page 5—K.)</p> <p>λ      26 4 8·19<br/>L      79 18 56·14<br/>H      540<br/>h      28†<br/>No. 12</p> <p>Karmer s.<br/>(Jálaun) In village of same name, about ½ mile<br/>W.S.W. of Lebupura and 1½ miles N.N.W. of Gura<br/>village; thána, tahsil and pargana Áta.</p> <p>λ      25 59 0·95<br/>L      79 35 21·94<br/>Nos. 134, 135</p> <p>Karri h.s.<br/>(Bundelkhand, Chhatarpur State) On a hill close<br/>to village of that name and about 2 miles W. by S.<br/>of Berauno village.</p> <p>λ      24 52 26·43<br/>L      79 46 32·00<br/>Nos. 78, 79</p> | <p>Karsán Tower.<br/>(Jálaun)      ° ' "</p> <p>λ      26 0 5<br/>L      79 28 13</p> <p>Karwai Village,<br/>(Jálaun) Date trees.</p> <p>λ      25 55 1<br/>L      79 35 34</p> <p>Kasáve Building (lamp).<br/>(Farrukhabad)</p> <p>λ      27 4 22·45<br/>L      79 35 5·45<br/>No. 282</p> <p>Kasáve Fort,<br/>(Farrukhabad) Flag on house.</p> <p>λ      27 4 23·1<br/>L      79 35 3·0<br/>No. 283</p> <p>Kashoro Fort.<br/>(Cawnpore)</p> <p>λ      26 18 17<br/>L      79 42 8<br/>No. 183</p> <p>Kasera Fort,<br/>(Mainpuri) Bastion.</p> <p>λ      26 59 17·0<br/>L      79 21 28·6</p> <p>Kasrak, XXVIII.<br/>(Vide page 8—K.)</p> <p>λ      28 3 22·65<br/>L      79 42 12·15<br/>H      608<br/>h      38<br/>No. 29</p> <p>Katora Tiled Building.<br/>(Saugor)</p> <p>λ      24 9 29·7<br/>L      79 5 26·5<br/>No. 35</p> <p>Katri Temple.<br/>(Cawnpore)</p> <p>λ      26 13 25·6<br/>L      79 44 41·4<br/>No. 166</p> <p>Khairnagar Fort.<br/>(Farrukhabad)</p> <p>λ      26 52 30<br/>L      79 50 38<br/>No. 268</p> |

\* This height refers to the mark-stone imbedded at the level of the ground, over which the perforated masonry column has been built.  
† Above the terreplein of the fort on which the tower stands.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                   | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Khairnagar Temple.<br/>(<i>Farrukhabad</i>)</p> <p>λ 26 53 16.1<br/>L 79 51 20.3<br/>No. 270</p>                                                                                                                                                                           | <p>Kudrail Fort,<br/>(<i>Etdawah</i>) Building on N.W. bastion.</p> <p>λ 26 54 15.8<br/>L 79 21 47.2<br/>Nos. 304, 305</p>                                                                                                                                      | <p>Kuthaund Fort,<br/>(<i>Jalaun</i>) White building.</p> <p>λ 26 21 52.2<br/>L 79 27 17.5<br/>No. 177</p>                                                                                                                                                                                            |
| <p>Khánpur Fort,<br/>(<i>Farrukhabad</i>) Highest turret.</p> <p>λ 26 49 34.2<br/>L 79 45 43.2<br/>Nos. 235, 236</p>                                                                                                                                                          | <p>Kuita s.<br/>(<i>Etdawah</i>) On fort, about <math>\frac{1}{2}</math> mile W. of a jhil and <math>1\frac{1}{2}</math> miles N.N.E. of Kowa village; thána Usrahár, tahsil and pargana Bharthna.</p> <p>λ 26 56 22.38<br/>L 79 17 47.39<br/>Nos. 289, 290</p> | <p>Kuthaund Temple.<br/>(<i>Jalaun</i>)</p> <p>λ 26 21 39.9<br/>L 79 27 17.3<br/>No. 176</p>                                                                                                                                                                                                          |
| <p>Khatoli Gateway.<br/>(<i>Bundelkhand, Panna State</i>) Tamarind tree on gateway (in ruins).</p> <p>λ 24 34 10.4<br/>L 79 24 21.9<br/>H 1408<br/>No. 57</p>                                                                                                                 | <p>Kukargaon Building.<br/>(<i>Jalaun</i>)</p> <p>λ 26 3 48.4<br/>L 79 26 20.2<br/>No. 140</p>                                                                                                                                                                  | <p>Laigaon Fort,<br/>(<i>Mainpuri</i>) S.W. bastion.</p> <p>λ 26 58 32.7<br/>L 79 21 52.3<br/>No. 309</p>                                                                                                                                                                                             |
| <p>Khera Bajhera s.<br/>(<i>Sháhjahánpur</i>) On mound in village of the same name, about <math>1\frac{1}{2}</math> miles W. of Báhanpur and <math>1\frac{1}{2}</math> miles E. of Bundia Kalán; pargana Khera Bajhera.</p> <p>λ 28 1 39.16<br/>L 79 35 11.06<br/>No. 343</p> | <p>Kumraul Tree,<br/>(<i>Farrukhabad</i>) Flag.</p> <p>λ 27 35 7<br/>L 79 36 53</p>                                                                                                                                                                             | <p>Lakna Fort,<br/>(<i>Etdawah</i>) Centre of bastion.</p> <p>λ 26 43 47.2<br/>L 79 35 30.4<br/>No. 216</p>                                                                                                                                                                                           |
| <p>Kishni Fort.<br/>(<i>Mainpuri</i>)</p> <p>λ 27 1 29<br/>L 79 18 15<br/>No. 315</p>                                                                                                                                                                                         | <p>Kundalpur Temple,<br/>(<i>Damoh</i>) Highest, on hill.</p> <p>λ 23 58 53.6<br/>L 79 46 3.7<br/>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p>                                                                | <p>Lughási Fort,<br/>(<i>Bundelkhand, Lughási Jáytr</i>) South or highest tower.</p> <p>λ 25 4 25.3<br/>L 79 37 36.2<br/>No. 89</p>                                                                                                                                                                   |
| <p>Korára Flag.<br/>(<i>Etdawah</i>)</p> <p>λ 26 32 40<br/>L 79 34 55</p>                                                                                                                                                                                                     | <p>Kúrsi s.<br/>(<i>Etdawah</i>) On mound, about <math>\frac{1}{2}</math> mile N.W. of Bunenpur and <math>1\frac{1}{2}</math> miles E. of Alápur; thána, tahsil and pargana Bidhúna.</p> <p>λ 26 48 6.05<br/>L 79 37 50.25<br/>Nos. 237, 238</p>                | <p>Mahewa Building,<br/>(<i>Jalaun</i>) Highest.</p> <p>λ 26 7 29.8<br/>L 79 39 49.6<br/>No. 150</p>                                                                                                                                                                                                  |
| <p>Koratha Temple.<br/>(<i>Jhánsi</i>)</p> <p>λ 25 43 29.1<br/>L 79 17 3.4<br/>No. 103</p>                                                                                                                                                                                    | <p>Kusma Temple.<br/>(<i>Bundelkhand, Chhatarpur State</i>) On hill.</p> <p>λ 25 1 29<br/>L 79 46 44</p>                                                                                                                                                        | <p>Mainpuri, Court House.<br/>(<i>Mainpuri</i>)</p> <p>λ 27 13 49.2<br/>L 79 5 38.7<br/>No. 321</p>                                                                                                                                                                                                   |
| <p>Kotra Temple,<br/>(<i>Jalaun</i>) E. minaret.</p> <p>λ 25 48 26.0<br/>L 79 21 4.8<br/>No. 107</p>                                                                                                                                                                          | <p>Kusmár, I.<br/>(<i>Vide page 4—K.</i>)</p> <p>λ 24 14 44.92<br/>L 79 22 51.13<br/>H 1815<br/>h 7<br/>No. 1</p>                                                                                                                                               | <p>Majelo Fort,<br/>(<i>Farrukhabad</i>) Flag on building.</p> <p>λ 26 54 29.8<br/>L 79 43 35.0<br/>Nos. 271, 272</p>                                                                                                                                                                                 |
| <p>Kudarkot Temple.<br/>(<i>Etdawah</i>)</p> <p>λ 26 48 41.9<br/>L 79 26 15.9<br/>No. 221</p>                                                                                                                                                                                 | <p>Kusmara Fort,<br/>(<i>Mainpuri</i>) Bungalow.</p> <p>λ 27 6 34.3<br/>L 79 19 40.6<br/>No. 319</p>                                                                                                                                                            | <p>Malhausi s.<br/>(<i>Etdawah</i>) On highest point in fort, about <math>1\frac{1}{2}</math> miles N.W. of Piprauli, 1 mile E. by S. of Nibhar and 2 miles S.S.W. of the large village of Bela; thána Bela, tahsil and pargana Bidhúna.</p> <p>λ 26 47 47.60<br/>L 79 42 51.45<br/>Nos. 244, 245</p> |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                  | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                        | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Malka Temple.</b><br/>(<i>Hamirpur</i>) On hill, about <math>\frac{1}{2}</math> of a mile E.N.E. of the junction of roads from Nowgong, Banda and Saugor and <math>2\frac{1}{2}</math> miles S.W. by S. of the village of Srinagar.</p> <p>o ' "</p> <p><math>\lambda</math> 25 8 45.1<br/>L 79 47 55.8<br/>No. 90</p> | <p><b>Masmaria Fort,</b><br/>(<i>Jalaun</i>) Flag.</p> <p>o ' "</p> <p><math>\lambda</math> 26 7 1<br/>L 79 34 11<br/>Nos. 147, 148</p>                                                                                                                                                            | <p><b>Munj Building,</b><br/>(<i>Etawah</i>) High.</p> <p>o ' "</p> <p><math>\lambda</math> 26 53 47.9<br/>L 79 12 0.7<br/>No. 302</p>                                                               |
| <p><b>Maman Fort,</b><br/>(<i>Etawah</i>) Highest square building.</p> <p><math>\lambda</math> 26 52 7.0<br/>L 79 19 26.9<br/>Nos. 296, 297</p>                                                                                                                                                                              | <p><b>Man, XXIV.</b><br/>(<i>Vide page 7—K.</i>)</p> <p><math>\lambda</math> 27 30 4.20<br/>L 79 42 50.90<br/>H 516<br/>h 38<br/>No. 25</p>                                                                                                                                                        | <p><b>Nabada Fort.</b><br/>(<i>Etawah</i>) Building on top of fort.</p> <p><math>\lambda</math> 26 28 30.6<br/>L 79 24 20.9<br/>No. 197</p>                                                          |
| <p><b>Manang, VII.</b><br/>(<i>Vide page 5—K.</i>)</p> <p><math>\lambda</math> 25 17 28.38<br/>L 79 45 35.16<br/>H<sub>s</sub> 1145.63*<br/>h 3<br/>No. 7</p>                                                                                                                                                                | <p><b>Mau Building.</b><br/>(<i>Etawah</i>) On W. bastion of fort.</p> <p><math>\lambda</math> 26 52 48.1<br/>L 79 41 13.3<br/>No. 257</p>                                                                                                                                                         | <p><b>Nagar Temple.</b><br/>(<i>Damoh</i>)</p> <p><math>\lambda</math> 24 3 15.1<br/>L 79 29 28.9<br/>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> |
| <p><b>Mangawan Building,</b><br/>(<i>Etawah</i>) Old.</p> <p><math>\lambda</math> 26 59 13.3<br/>L 79 9 56.9<br/>No. 312</p>                                                                                                                                                                                                 | <p><b>Mau Saria Temple.</b><br/>(<i>Bundelkhand, Chhatarpur State</i>) On hill, about 3 miles S.E. by E. of the new barracks in Nowgong cantonment.</p> <p><math>\lambda</math> 25 0 47.8<br/>L 79 31 46.1<br/>No. 87</p>                                                                          | <p><b>Nagonath, VIII.</b><br/>(<i>Vide page 5—K.</i>)</p> <p><math>\lambda</math> 25 26 54.19<br/>L 79 22 39.73<br/>H 987<br/>h Not forthcoming<br/>No. 8</p>                                        |
| <p><b>Mangrai Building.</b><br/>(<i>Bundelkhand, Panna State</i>) A window in S.E. face of a two storied square building in village.</p> <p><math>\lambda</math> 24 15 20.6<br/>L 79 18 28.5<br/>No. 42</p>                                                                                                                  | <p><b>Mauda s.</b><br/>(<i>Farrukhabad</i>) On house in village, about <math>\frac{1}{2}</math> mile E.S.E. of Atsani and <math>1\frac{1}{2}</math> miles N.E. of Lukraula village; thana and pargana Muhammadabad.</p> <p><math>\lambda</math> 27 17 1.09<br/>L 79 30 44.71<br/>Nos. 326, 327</p> | <p><b>Nagroa h.s.</b><br/>(<i>Bundelkhand, Bijawar State</i>)</p> <p><math>\lambda</math> 24 43 19.30<br/>L 79 30 30.56<br/>H 1449<br/>Nos. 68, 69</p>                                               |
| <p><b>Maniagarh h.s.</b><br/>(<i>Bundelkhand, Chhatarpur State</i>) On a hill close to and S. of Rajgarh, N.W. of Raipura and N.E. of Patan village.</p> <p><math>\lambda</math> 24 42 49.73<br/>L 79 58 29.79<br/>H 1651<br/>Nos. 66, 67</p>                                                                                | <p><b>Muhammadabad, XXII.</b><br/>(<i>Vide page 7—K.</i>)</p> <p><math>\lambda</math> 27 18 24.05<br/>L 79 28 6.98<br/>H 565<br/>h 171<br/>No. 22</p>                                                                                                                                              | <p><b>Naili Fort,</b><br/>(<i>Cawnpore</i>) Centre of haveli (in ruins).</p> <p><math>\lambda</math> 26 47 1.9<br/>L 79 52 41.9<br/>No. 261</p>                                                      |
| <p><b>Mankahri House.</b><br/>(<i>Bundelkhand, Chhatarpur State</i>) Dhaukal Singh's house in village.</p> <p><math>\lambda</math> 25 0 28.6<br/>L 79 49 14.2<br/>No. 86</p>                                                                                                                                                 | <p><b>Muhammadabad s.</b><br/>(<i>Jalaun</i>) In village, about <math>1\frac{1}{2}</math> miles S.W. of Kal-kanda and 2 miles N.E. of Kusmilia; thana and tahsil Orai, pargana Muhammadabad.</p> <p><math>\lambda</math> 25 55 56.56<br/>L 79 29 35.01<br/>Nos. 117, 118</p>                       | <p><b>Nandu Sahail Fort,</b><br/>(<i>Etawah</i>) Building.</p> <p><math>\lambda</math> 26 39 52.9<br/>L 79 40 51.6<br/>No. 205</p>                                                                   |
| <p><b>Mardangaib Temple.</b><br/>(<i>Hamirpur</i>) On hill.</p> <p><math>\lambda</math> 25 36 8.8<br/>L 79 32 31.6<br/>No. 98</p>                                                                                                                                                                                            | <p><b>Mukana Hill Mark.</b><br/>(<i>Bundelkhand, Bijawar State</i>)</p> <p><math>\lambda</math> 24 41 8.05<br/>L 79 49 34.86<br/>No. 83</p>                                                                                                                                                        | <p><b>Narayanpur Fort,</b><br/>(<i>Bundelkhand, Bijawar State</i>) W. corner of Building.</p> <p><math>\lambda</math> 24 40 40.2<br/>L 79 36 43.1<br/>H 1061<br/>No. 72</p>                          |
|                                                                                                                                                                                                                                                                                                                              | <p><b>Narsingharh Fort,</b><br/>(<i>Damoh</i>) Flag.</p> <p><math>\lambda</math> 23 59 55.4<br/>L 79 26 24.4<br/>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p>                                                                                    |                                                                                                                                                                                                      |

\* This height refers to the mark on the upper surface of the circular paka platform.

† Above the bastion of the fort on which the tower stands.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Nawábganj s.<br/>(<i>Farrukhabad</i>) On thána in village of the same name, about <math>1\frac{1}{2}</math> miles W. by N. of Sirmaua and <math>1\frac{1}{2}</math> miles N. E. of Birpur village; thána Nawábganj, tahsil and pargana Shamsabad.</p> <p style="text-align: center;">o ' "</p> <p>λ 27 26 9.65<br/>L 79 26 44.94<br/>No. 334</p> <p>Nibora Temple,<br/>(<i>Damoh</i>) Staircase.</p> <p>λ 24 0 55.0<br/>L 79 20 22.3</p> <p>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Nipania, XIII.<br/>(<i>Vide page 5—K.</i>)</p> <p>λ 26 13 30.70<br/>L 79 37 52.27<br/>H 477<br/>h 39<br/>No. 13</p> <p>Nipania Village.<br/>(<i>Jálaun</i>)</p> <p>λ 26 12 26<br/>L 79 38 40</p> <p>Niwar Tiled Building.<br/>(<i>Bundelkhand, Panna State</i>)</p> <p>λ 24 12 46.6<br/>L 79 7 56.7<br/>No. 36</p> <p>Orai Temple.<br/>(<i>Jálaun</i>)</p> <p>λ 25 59 9.8<br/>L 79 29 33.3<br/>Nos. 132, 133</p> <p>Orekhi Fort,<br/>(<i>Jálaun</i>) Tree on S.E. bastion.</p> <p>λ 26 11 1.9<br/>L 79 20 18.8<br/>No. 161</p> <p>Oroláki Fort,<br/>(<i>Etáwáh</i>) Bastion.</p> <p>λ 26 46 50.5<br/>L 79 46 23.5<br/>No. 246</p> <p>Pai Temple.<br/>(<i>Bundelkhand, Ohhatarpur State</i>)</p> <p>λ 24 53 39.6<br/>L 79 56 18.4<br/>No. 84</p> | <p>Pál House,<br/>(<i>Jálaun</i>) In village.</p> <p style="text-align: center;">o ' "</p> <p>λ 26 14 47.0<br/>L 79 38 48.1<br/>No. 168</p> <p>Palera Temple,<br/>(<i>Bundelkhand, Orchha State</i>) On hill.</p> <p>λ 25 0 39.5<br/>L 79 16 16.7<br/>No. 88</p> <p>Panchamnagar Temple.<br/>(<i>Damoh</i>)</p> <p>λ 24 3 41.6<br/>L 79 12 21.1</p> <p>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Parásan Fort,<br/>(<i>Jálaun</i>) Flag.</p> <p>λ 25 56 3<br/>L 79 43 50<br/>No. 131</p> <p>Parásan Temple.<br/>(<i>Jálaun</i>)</p> <p>λ 25 56 16.9<br/>L 79 43 52.5<br/>No. 122</p> <p>Parasna Fort,<br/>(<i>Etáwáh</i>) Turret.</p> <p>λ 26 57 51.5<br/>L 79 8 32.2<br/>No. 308</p> <p>Parbata s.<br/>(<i>Bareilly</i>) In village about <math>\frac{1}{2}</math> mile W.S.W. of Kíratpur, <math>\frac{1}{2}</math> mile S. of Dothoka and <math>1\frac{1}{2}</math> miles E. by N. of Rámpura village; thána and pargana Faríd-pur.</p> <p>λ 28 14 37.25<br/>L 79 30 9.86<br/>No. 351</p> <p>Parbatpur s.<br/>(<i>Jálaun</i>) On mound on road from Jálaun to Kálpi, about <math>1\frac{1}{2}</math> miles W. by N. of Aditpur on the same road and same distance S.E. of Kusmara; thána, tahsil and pargana Jálaun.</p> <p>λ 26 8 16.24<br/>L 79 28 9.31<br/>Nos. 144, 145</p> <p>Parín Fort Mark (lamp).<br/>(<i>Etáwáh</i>)</p> <p>λ 26 30 1.73<br/>L 79 31 48.27<br/>No. 203</p> | <p>Patera h.s.<br/>(<i>Damoh</i>) On a hill close to and S. of village of the same name and N. of Minwar and about <math>1\frac{1}{2}</math> miles E. of Seria village.</p> <p style="text-align: center;">o ' "</p> <p>λ 24 4 30.47<br/>L 79 26 40.91</p> <p>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Patharia h.s.<br/>(<i>Damoh</i>) On a hill close to and W. of village of the same name and about 2 miles N.N.W. of Bansa.</p> <p>λ 23 53 45.02<br/>L 79 12 42.79</p> <p>See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Perona Fort.<br/>(<i>Jálaun</i>)</p> <p>λ 25 51 9<br/>L 79 11 21<br/>No. 112</p> <p>Phaphúnd Building.<br/>(<i>Etáwáh</i>) Flag on highest building.</p> <p>λ 26 35 51.2<br/>L 79 30 15.8<br/>No. 204</p> <p>Phára, IX.<br/>(<i>Vide page 5—K.</i>)</p> <p>λ 25 41 7.57<br/>L 79 42 54.66<br/>H 637<br/>h Not forthcoming<br/>No. 9</p> <p>Pharenji Fort,<br/>(<i>Mainpuri</i>) Building.</p> <p>λ 26 59 51.5<br/>L 79 16 25.0<br/>No. 313</p> <p>Pichora Building,<br/>(<i>Cawnpore</i>) In village.</p> <p>λ 26 14 34.0<br/>L 79 41 55.4<br/>No. 167</p> <p>Pinarthu Temple.<br/>(<i>Cawnpore</i>)</p> <p>λ 26 24 33.8<br/>L 79 38 53.7<br/>No. 189</p> <p>Pola h.s.<br/>(<i>Bundelkhand, Bijáwar State</i>) On a detached peak about 2 miles N.W. of Chopra village, <math>1\frac{1}{2}</math> miles N.E. of Biakana and <math>2\frac{1}{2}</math> miles S.E. of Súrjapur village.</p> <p>λ 24 28 22.82<br/>L 79 26 19.18<br/>H 1732<br/>Nos. 54, 55</p> |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Ponti Fort,<br/>(Etáwah) Ruins.</p> <p>λ 26 41 39<br/>L 79 39 53<br/>No. 206</p> <p>Pothári, XXIII.<br/>(Vide page 7—K.)</p> <p>λ 27 23 16.45<br/>L 79 27 21.41<br/>H 574<br/>h 38<br/>Nos. 23, 24</p> <p>Punja Fort,<br/>(Etáwah) Building.</p> <p>λ 26 53 10.4<br/>L 79 14 37.2<br/>No. 301</p> <p>Putli Bakoára h.s.<br/>(Bundelkhand, Chhatarpur State) On a detached hill close to and S.E. of Bakoára village, 1 mile S. by W. of Seori and ½ mile N.E. of Putli or Putri.</p> <p>λ 24 57 56.16<br/>L 79 51 22.64<br/>No. 80</p> <p>Ragauli Fort.<br/>(Bundelkhand, Bijáwar State) S. W. angle of highest building.</p> <p>λ 24 44 17.4<br/>L 79 33 34.5<br/>H 1226<br/>No. 74</p> <p>Ráipura Fort,<br/>(Jhánsi) Flag.</p> <p>λ 25 35 24<br/>L 79 20 3</p> <p>Ráipura Temple.<br/>(Jhánsi)</p> <p>λ 25 35 15<br/>L 79 20 14</p> <p>Ráj Nagar Temple.<br/>(Bundelkhand, Chhatarpur State) N.W. of town.</p> <p>λ 24 53 40<br/>L 79 57 9</p> <p>Rangir, X.*<br/>(Vide page 4—K.)</p> <p>λ 24 0 20.37<br/>L 79 28 26.43<br/>H 1184<br/>h 5<br/>No. 1</p> | <p>Rasdhán Fort.<br/>(Cawnpore) Square Building to N.E.</p> <p>λ 26 21 41.2<br/>L 79 42 8.2<br/>No. 184</p> <p>Rathgaon Fort,<br/>(Etáwah) Flag.</p> <p>λ 26 49 27<br/>L 79 31 54</p> <p>Rauli s.<br/>(Farrukhabad) On house in village of that name about 1½ miles S.E. of Sikandarpur, 1 mile E. by N. of Singlipur and 1½ miles W. by S. of Daulat Sarai; thána and pargana Chhibramau.</p> <p>λ 27 7 5.32<br/>L 79 39 25.88<br/>Nos. 273, 274</p> <p>Rausen Fort (lamp).<br/>(Farrukhabad)</p> <p>λ 26 59 21.86<br/>L 79 35 30.14<br/>Nos. 280, 281</p> <p>Rewábarti Temple.<br/>(Hamirpur) On hill.</p> <p>λ 25 36 33.1<br/>L 79 26 48.7<br/>Nos. 96, 97</p> <p>Rinia Building.<br/>(Jálaun)</p> <p>λ 25 57 36.8<br/>L 79 28 4.9<br/>No. 125</p> <p>Roshanabad House,<br/>(Farrukhabad) Flag.</p> <p>λ 27 29 43.6<br/>L 79 30 39.3<br/>Nos. 335, 336</p> <p>Ruru (Bara) Fort.<br/>(Etáwah) †</p> <p>λ 26 45 21<br/>L 79 30 19<br/>No. 219</p> <p>Ruru (Chhota) Old Fort,<br/>(Etáwah) Centre, highest wall.</p> <p>λ 26 45 53.5<br/>L 79 28 37.0<br/>No. 220</p> <p>Sabhad Fort,<br/>(Etáwah) Flag on bastion.</p> <p>λ 26 51 40.1<br/>L 79 34 24.4<br/>Nos. 224, 225</p> | <p>Sagauli Temple.<br/>(Jhánsi) On hill.</p> <p>λ 25 41 31.1<br/>L 79 9 18.5<br/>No. 102</p> <p>Sahár Fort,<br/>(Etáwah) Flag.</p> <p>λ 26 45 30<br/>L 79 38 6<br/>Nos. 217, 218</p> <p>Sahu Building.<br/>(Jálaun) On mound.</p> <p>λ 26 12 41.8<br/>L 79 21 56.1<br/>No. 163</p> <p>Saipur, XXVII.<br/>(Vide page 7—K.)</p> <p>λ 27 54 59.21<br/>L 79 27 5.58<br/>H 539<br/>h 38<br/>No. 28</p> <p>Sakráwa s.<br/>(Farrukhabad) On building in fort about 1½ miles W. of Rasáulpur and ½ mile E. of Devápur; thána and pargana Sakráwa.</p> <p>λ 26 59 3.96<br/>L 79 27 11.28<br/>Nos. 285, 286</p> <p>Sámán s.<br/>(Mainpuri) On fort about ½ mile S.S.W. of Katra village and 3¼ miles W.S.W. of Harchandpur; thána Kishni, tahsil Bhongaon and pargana Kishni-Nabiganj.</p> <p>λ 27 1 26.47<br/>L 79 13 58.02<br/>No. 284</p> <p>Samárhú Fort,<br/>(Jálaun) Tree.</p> <p>λ 26 13 8<br/>L 79 36 26<br/>No. 170</p> <p>Sandi Fort,<br/>(Jálaun) Flag.</p> <p>λ 26 0 35<br/>L 79 38 28<br/>No. 136</p> <p>Sánra h.s.<br/>(Bundelkhand, Chhatarpur State) On hill about 1½ miles N.W. of Tipári village and close to and N. of Tipári Ghát and 2 miles S.W. of Raichor village.</p> <p>λ 24 25 33.89<br/>L 79 42 23.69<br/>H 1734<br/>No. 63</p> |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.



| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Sarāwan Fort,<br/>(Jālaun) Flag on eastern corner of palace.</p> <p>λ 26 14 37.1<br/>L 79 19 52.1<br/>Nos. 171, 172</p> <p>Sarhar Fort,<br/>(Jālaun) Flag.</p> <p>λ 26 4 37<br/>L 79 19 3</p> <p>Sarhau Fort,<br/>(Etāwah) Highest white building.</p> <p>λ 26 49 56.2<br/>L 79 20 29.4<br/>Nos. 294, 295</p> <p>Sarsai Fort.<br/>(Jālaun)</p> <p>λ 26 10 47<br/>L 79 31 50<br/>No. 160</p> <p>Sauj Building.<br/>(Mainpuri) On mound.</p> <p>λ 27 1 26.3<br/>L 79 11 9.9<br/>No. 316</p> <p>Saunāsi Fort.<br/>(Mainpuri)</p> <p>λ 27 3 45<br/>L 79 20 11<br/>No. 318</p> <p>Sayyidnagar Temple.<br/>(Jālaun)</p> <p>λ 25 48 56.5<br/>L 79 18 31.0<br/>No. 108</p> <p>Semra Fort,<br/>(Bundelkhand, Panna State) N.W. tower.</p> <p>λ 24 14 0.1<br/>L 79 22 14.3<br/>No. 38</p> <p>Senpa Temple.<br/>(Bundelkhand, Bijāwar State) On hill.</p> <p>λ 24 32 25.2<br/>L 79 17 38.6<br/>H 1368<br/>No. 56</p> <p>Seod s.<br/>(Etāwah) On fort bastion about 2 miles S. of Phaphūnd Railway Station and 1½ miles E. by S. of Lahā-khar; thāna, tahsil and pargana Phaphūnd.</p> <p>λ 26 36 4.01<br/>L 79 36 15.99<br/>Nos. 199, 200</p> | <p>Seonri Temple,<br/>(Hamīrpur) Spire.</p> <p>λ 25 29 44.6<br/>L 79 24 35.8<br/>No. 95</p> <p>Seontāra, XVII.<br/>(Vide page 6—K.)</p> <p>λ 26 42 25.60<br/>L 79 37 59.11<br/>H 518<br/>h 17*<br/>No. 17</p> <p>Seonthana Fort,<br/>(Etāwah) Building.</p> <p>λ 26 55 53.6<br/>L 79 19 11.1<br/>No. 306</p> <p>Seyah h.s.<br/>(Bundelkhand, Chhatarpur State) On a low range of hills skirting the road from Saugor to Bānda, about 2 miles S. by W. of Malāra village.</p> <p>λ 25 0 32.99<br/>L 79 42 14.64<br/>Nos. 76, 77</p> <p>Shāhabad s.<br/>(Shāhjahānpur) On tree in village about ½ mile W. of Kuthua Bhoj, the same distance N.E. of Bahari and ½ mile S. of Mādora; pargana Khara Bajhera.</p> <p>λ 27 57 26.19<br/>L 79 36 1.92<br/>No. 344</p> <p>Shāhgarh Fort,<br/>(Saugor) N.W. corner of highest building.</p> <p>λ 24 16 27.6<br/>L 79 9 46.1<br/>H 1328<br/>No. 47</p> <p>Shamsabad s.<br/>(Farrukhabad) On house in town of that name about 1½ miles N.W. of Alipur, ½ mile N. by E. of Sikandarpur and 1½ miles N.E. of Niwalpur; thāna and pargana Shamsabad.</p> <p>λ 27 32 14.71<br/>L 79 28.45.78<br/>No. 337</p> <p>Shamsherganj Fort,<br/>(Mainpuri) Bastion.</p> <p>λ 27 0 11.8<br/>L 79 22 12.9<br/>No. 314</p> | <p>Siahari Mound,<br/>(Jālaun) Tree.</p> <p>λ 26 5 48<br/>L 79 29 20<br/>No. 146</p> <p>Sikandra s.<br/>(Cawnpore) On highest turret of house in town of that name about ½ mile N.W. of Mānpur and 2 miles W. by N. of Rasdhān fort; thāna and pargana Sikandra.</p> <p>λ 26 21 57.40<br/>L 79 40 16.18<br/>No. 178</p> <p>Siriāo Fort,<br/>(Etāwah) W. bastion.</p> <p>λ 26 50 24.1<br/>L 79 40 15.3<br/>Nos. 250, 251</p> <p>Sirsa Fort,<br/>(Jālaun) S.W. building.</p> <p>λ 26 17 22<br/>L 79 28 19</p> <p>Sirsai Fort,<br/>(Farrukhabad) Tree on mound.</p> <p>λ 26 49 15.2<br/>L 79 47 53.3<br/>No. 249</p> <p>Sirwabara h.s.<br/>(Jhānsi) On a detached hill immediately W. of Marha village and N. of Haibathpur; thāna, tahsil and pargana Garotha.</p> <p>λ 25 34 24<br/>L 79 16 33</p> <p>Sisgarh, X.†<br/>(Vide page 8—K.)</p> <p>λ 28 43 38.07<br/>L 79 21 16.72<br/>H 670<br/>h 38<br/>No. 34</p> <p>Sonār Hill Mark.<br/>(Bundelkhand, Bijāwar State)</p> <p>λ 24 53 17.33<br/>L 79 27 58.44<br/>No. 75</p> <p>Sonha h.s.<br/>(Bundelkhand, Chhatarpur State) On a hill close to and W. of the waterfall N. of Kakra village and S.E. of Kasail Ghāt.</p> <p>λ 24 32 12.38<br/>L 79 51 40.08<br/>H 1765<br/>No. 64</p> |

\* Above the level of summit of the fort tower on which the station is placed.

† Of the North-East Longitudinal Series.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Sukhi Fort.<br/>(<i>Farrukhabad</i>)      ° ' "</p> <p>λ      26 52 43<br/>L      79 47 5<br/>No. 269</p> <p>Sumáin Fort.<br/>(<i>Etáwáh</i>)</p> <p>λ      26 50 57<br/>L      79 28 7<br/>Nos. 222, 223</p> <p>Táka Fort,<br/>(<i>Etáwáh</i>) W. bastion.</p> <p>λ      26 52 30·6<br/>L      79 21 59·9<br/>Nos. 298, 299</p> <p>Tálgaon Hill Mark.<br/>(<i>Bundelkhand, Panna State</i>)</p> <p>λ      24 34 56·84<br/>L      80 7 18·72<br/>H      1744<br/>No. 65</p> <p>Tarsor Fort,<br/>(<i>Jálawn</i>) Window of building on bastion.</p> <p>λ      26 16 8·3<br/>L      79 27 28·5<br/>Nos. 173, 174</p> <p>Thanela, VI.<br/>(<i>Vide page 5—K.</i>)</p> <p>λ      24 57 53·79<br/>L      79 47 29·61<br/>H      1098<br/>h      Not forthcoming<br/>No. 6</p> | <p>Tiar Fort,<br/>(<i>Etáwáh</i>) N.E. bastion.      ° ' "</p> <p>λ      26 28 19·6<br/>L      79 21 49·4<br/>No. 196</p> <p>Tilona Temple.<br/>(<i>Bundelkhand, Chhatarpur State</i>) On hill.</p> <p>λ      24 54 46·7<br/>L      79 46 32·0<br/>No. 85</p> <p>Tinsmál, VII.*<br/>(<i>Vide page 3—K.</i>)</p> <p>λ      24 7 12·97<br/>L      79 2 12·45<br/>H      2139<br/>h      9<br/>No. 1</p> <p>Tirwa Palace,<br/>(<i>Farrukhabad</i>) Staircase.</p> <p>λ      26 57 44·5<br/>L      79 49 50·6<br/>No. 277</p> <p>Tirwa Temple,<br/>(<i>Farrukhabad</i>) Prominent.</p> <p>λ      26 57 45·8<br/>L      79 50 25·1<br/>Nos. 278, 279</p> <p>Tonga Fort,<br/>(<i>Cawnpore</i>) Bungalow on S.W. bastion.</p> <p>λ      26 11 45<br/>L      79 46 44</p> | <p>Túrah Shergarh h.s.<br/>(<i>Hamirpur</i>) On a detached hill about 4 miles W. N.W. of Kaitha village and same distance N. of the large village of Panwári; thána, tahsil and pargana Ráth.</p> <p>λ      25 29 22·99<br/>L      79 30 45·23<br/>No. 92</p> <p>Unchagaon s.<br/>(<i>Bareilly</i>) On mound on left bank of the Rám-ganga river, about 2 miles W. of Bareilly city, 1½ miles S.S.W. of Bákarganj village and 1½ miles N. by E. of Chaupál; thána Bareilly, pargana Karor.</p> <p>λ      28 20 30·73<br/>L      79 24 50·27<br/>Nos. 349, 350</p> <p>Urgaon Temple.<br/>(<i>Jálawn</i>)</p> <p>λ      26 8 1·8<br/>L      79 26 17·6<br/>Nos. 151, 152</p> <p>Usrári Fort,<br/>(<i>Etáwáh</i>) Building.</p> <p>λ      26 33 41<br/>L      79 37 12</p> <p>Yani s.<br/>(<i>Etáwáh</i>) On centre of W. bastion of fort on road from Phaphúnd to Jhānsi <i>via</i> Dalínagar, about 3 miles W.S.W. of Roshangpur and 4 miles N. of Bijhalpur on N. bank of the Jumna; thána, tahsil and pargana Auraiya.</p> <p>λ      26 27 38·09<br/>L      79 23 10·34<br/>Nos. 192, 193</p> |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

July 1879.

J. B. N. HENNESSEY,  
In charge of Computing Office.

## RANGIR MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives the present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

| No.<br>of Station | Local name | District                        | Pargana, &c.                                            | Village in which<br>the Station<br>lies | Remarks on the<br>Construction and Condition<br>of the Station |
|-------------------|------------|---------------------------------|---------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------|
| VII*              | ...        | Saugor                          | Thá., Tah. and P. Banda                                 | Tinsi                                   | ... ..                                                         |
| X*                | ...        | Damoh                           | Tah. Damoh                                              | Rangír                                  | ... ..                                                         |
| I                 | ...        | Bundelkhand<br>Political Agency | P. Bakswáho                                             | Kusmár                                  | ... ..                                                         |
| II                | ...        | „                               | P. Bijawar                                              | Dálipur                                 | ... ..                                                         |
| III               | ...        | „                               | Ditto.                                                  | ...                                     | ... ..                                                         |
| IV                | Bhojraj    | „                               | P. Baldeogarh                                           | Sarkanpur                               | ... ..                                                         |
| V                 | Chabútara  | Hamírpur                        | Thá. Ajnár, Tah. Kul-<br>pahár, P. Panwári-Jait-<br>pur | Narwara                                 | ... ..                                                         |
| VI                | ...        | Bundelkhand<br>Political Agency | P. Chhatarpur                                           | Sela                                    | ... ..                                                         |
| VII               | Chabútara  | Hamírpur                        | Tah. and Thá. Kulpahár,<br>P. Panwári-Jaitpur           | Salat Malat of<br>Garhauí Jágír         | ... ..                                                         |
| VIII              | ...        | Jhánsi                          | Tah. Garotha                                            | Gura                                    | ... ..                                                         |
| IX                | Chabútara  | Hamírpur                        | Thá. Jariya, Tah. and P.<br>Ráth                        | Phára                                   | ... ..                                                         |

NOTE.—Stations VII\* and X\* appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral. P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

| No. of Station | Local name            | District              | Pargana, &c.                                     | Village in which the Station lies | Remarks on the Construction and Condition of the Station                                                                                                                                              |
|----------------|-----------------------|-----------------------|--------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X              | Firangi-ka-Cha-bútara | Jhánsi-Gursarai State | Tah. Garotha                                     | Gokulphára                        | ...                                                                                                                                                                                                   |
| XI             | Sorái                 | Jálaun                | Thá. and Tah. Orai                               | Gura Khurd                        | In 1872, the District Officer reported the station as completely destroyed by the rains of 1871. In 1873, a paka platform was built by the same Officer for the protection of the mark-stone.         |
| XII            | "                     | "                     | Thá. and Tah. Jálaun                             | Kanwa                             | ...                                                                                                                                                                                                   |
| XIII           | "                     | "                     | Thá. Damrás, Tah. Kálpi                          | Nipania                           | ...                                                                                                                                                                                                   |
| XIV            | "                     | "                     | Thá. Kuthaund, Tah. Má-dhogarh                   | Husapura                          | ...                                                                                                                                                                                                   |
| XV             | ...                   | Cawnpore              | Thá. and P. Derapur                              | Gandaspur                         | The mark-stone in the floor of the arched passage was found intact. The corners at the base of the pillar and the interior of the arched passage much injured by the digging out of bricks.           |
| XVI            | ...                   | Etáwah                | Tah. and P. Auraiya, Táluka Bhareh, Thá. Ajítmal | Atsu                              | ...                                                                                                                                                                                                   |
| XVII           | ...                   | "                     | Thá. Sahail, Tah. and P. Bidhúna                 | Seontára                          | The corners at the base of the pillar and the interior of the arched passage were found considerably injured as at (XV) Gandaspur Station. The hollow in the passage was filled in with burnt bricks. |
| XVIII          | Barona Kalán          | "                     | Thá. Kudarkat, Tah. and P. Bidhúna               | Barona Kalán                      | The mark-stone in the floor of the arched passage was found all right, the corners of the pillar injured at the base.                                                                                 |
| XIX            | Minára                | Farrukhabad           | Tah. and P. Tirwa                                | Kalsán                            | The mark-stone in the floor of the arched passage was found all right, the pillar above the arch cracked.                                                                                             |
| XX             | Mastúl or Minár       | "                     | Tah. and P. Chhibramau                           | Bisungarh                         | The mark-stone in the floor of the arched passage was found perfect, as also the pillar.                                                                                                              |
| XXI            | Minára or Gar-gaj     | "                     | P. Bhojpur, Tah. Farrukhabad                     | Rájípur                           | The mark-stone in the arched passage was found perfect, the arch cracked on one side by the digging out of bricks.                                                                                    |
| XXII           | "                     | "                     | P. Muhammadabad, Tah. Farrukhabad                | Muhammadabad Khás                 | The tower considerably dug into at the base, on the east face the excavation reaching the central pillar, the tower was repaired with burnt bricks.                                                   |

NOTE.—Stations XV to XXXI, also X and XI of the North-East Longitudinal Series, were visited in 1866 by Mr. W. Ivey, Assistant Surveyor, especially deputed for the purpose. The perforated masonry pillars at these stations were found more or less dug into at their bases and bricks extracted from the interior of the arched passages, and otherwise injured by cracks. These pillars were protected by Mr. Ivey as follows:—the arched passages were closed, platforms of sun-dried bricks built around the bases of the pillars to height of from 10 to 14 feet, and the openings at their summits capped by conical mounds to carry off the rain fall; after which all these stations were transferred to the charge of the chief local Officer.

| No.<br>of Station | Local name            | District     | Pargana, &c.                            | Village in which<br>the Station<br>lies | Remarks on the<br>Construction and Condition<br>of the Station                                                                                                                                                                                                                                  |
|-------------------|-----------------------|--------------|-----------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| XXIII             | Minára or Gar-<br>gaj | Farrukhabad  | P. Muhammadabad, Tah.<br>Farrukhabad    | Pothári                                 | The mark-stone in the floor of the<br>arched passage was found perfect,<br>the interior of the passage and its<br>floor injured.                                                                                                                                                                |
| XXIV              | Minára                | „            | P. Imratpur, Tah. Ali-<br>garh          | Mau Rasúlpur                            | The mark-stone in the floor of the<br>arched passage was found dug out,<br>the pillar much injured and dug<br>into.                                                                                                                                                                             |
| XXV               | Gundi                 | Sháhjahánpur | Tah. and P. Jalálabad                   | Gundi                                   | The mark-stone in the floor of the<br>passage was found perfect, the pillar<br>injured at the base on all sides,<br>and its arch cracked on the east<br>side.                                                                                                                                   |
| XXVI              | Dháka                 | „            | Ditto.                                  | Dháka                                   | Ditto.                                                                                                                                                                                                                                                                                          |
| XXVII             | Sháhpur               | Budaun       | Thá. and P. Hazratpur,<br>Tah. Dátaganj | Sháhpur                                 | The mark-stone in the floor of the<br>arched passage was found cracked,<br>its central iron pin extracted though<br>the stone appeared to be firmly<br>imbedded, the pillar was slightly<br>injured at the base.                                                                                |
| XXVIII            | ...                   | Sháhjahánpur | Tah. Tilhar, P. Miráu-<br>pur Katra     | Kasrak                                  | The station was found completely<br>destroyed down to the very foun-<br>dation; below the <i>debris</i> the mark-<br>stone was found lying loose, this was<br>embedded below the ground level<br>and a conical pillar, 12 feet in<br>height, built over it, to mark the<br>site of the station. |
| XXIX              | Chanjiri              | Bareilly     | P. Ballia                               | Chanjiri                                | The mark-stone in the floor of the<br>arched passage was found all right,<br>the base of the pillar much injured<br>by the digging out of bricks.                                                                                                                                               |
| XXX               | ...                   | „            | P. Farádpur                             | Gajnara                                 | Ditto.                                                                                                                                                                                                                                                                                          |
| XXXI              | ...                   | „            | P. Karor                                | Fatehganj                               | ...                                                                                                                                                                                                                                                                                             |
| X                 | ...                   | „            | P. Sirsáwán                             | Sísgarh                                 | ...                                                                                                                                                                                                                                                                                             |
| XI                | ...                   | „            | P. Richha                               | Atária                                  | ...                                                                                                                                                                                                                                                                                             |

NOTE.—Stations X and XI appertain to the North-East Longitudinal Series.

P. stands for pargana, Tah. for tahsil, and Thá for thána.

September, 1882.

 J. B. N. HENNESSEY,  
In charge of Computing Office.



*List of Published Works of the Great Trigonometrical Survey of India.*

---

An Account of the Measurement of an Arc of the meridian between the parallels of  $18^{\circ} 3'$  and  $24^{\circ} 7'$ , being a continuation of the Grand Meridional Arc of India as detailed by the late Lieutenant-Colonel Lambton in the Volumes of the Asiatic Society of Calcutta. By Captain George Everest, of the Bengal Artillery, F.R.S., &c. London, 1830.

An Account of the Measurement of two Sections of the Meridional Arc of India, bounded by the parallels of  $18^{\circ} 3' 5''$ ;  $24^{\circ} 7' 11''$ ; and  $29^{\circ} 30' 18''$ . By Lieutenant-Colonel Everest, F.R.S., &c., late Surveyor General of India, and his Assistants. London, 1847.

---

Account of the Operations of the Great Trigonometrical Survey of India.

- Volume I. The Standards of Measure and the Base-Lines, also an Introductory Account of the early Operations of the Survey, during the period of 1800-1830. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey. Dehra Dún, 1870.
- Do. II. History and General Description of the Principal Triangulation and of its Reduction. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.
- Do. III. The Principal Triangulation, the Base-Line Figures, the Karáchi Longitudinal, N.W. Himalaya, and Great Indus Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1873.
- Do. IV. The Principal Triangulation, the Great Arc (Section  $24^{\circ}$ - $30^{\circ}$ ), Rahún, Gurbágarh and Jogí-Tíla Meridional Series, and the Sutlej Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1876.
- Do. V. Details of the Pendulum Operations by Captains J. P. Basevi, R.E., and W. J. Heaviside, R.E., and of their Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún and Calcutta, 1879.
- Do. VI. The Principal Triangulation of the South-East Quadrilateral including the Great Arc—Section  $18^{\circ}$  to  $24^{\circ}$ , the East Coast Series, the Calcutta and the Bider Longitudinal Series, the Jabalpur and the Biláspur Meridional Series, and the Details of their Simultaneous Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1880.

*List of Published Works of the Great Trigonometrical Survey of India—(Continued).*

Account of the Operations of the Great Trigonometrical Survey of India—(Continued).

- Volume VII. General Description of the Principal Triangulation of the North-East Quadrilateral including the Simultaneous Reduction and the Details of Five of the Component Series, the North-East Longitudinal, the Budhon Meridional, the Rangir Meridional, the Amua Meridional, and the Karára Meridional. Prepared under the directions of Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
- Do. VIII. Details of the Principal Triangulation of Eleven of the Component Series of the North-East Quadrilateral, including the following Series; the Gurwáni Meridional, the Gora Meridional, the Hurílaong Meridional, the Chendwár Meridional, the North Párasnáth Meridional, the North Malúncha Meridional, the Calcutta Meridional, the East Calcutta Longitudinal, the Brahmaputra Meridional, the Eastern Frontier—Section  $23^{\circ}$  to  $26^{\circ}$ , and the Assam Longitudinal. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
- Do. IX. Electro-Telegraphic Longitude Operations executed during the years 1875-77 and 1880-81, by Lieut.-Colonel W. M. Campbell, R.E., and Major W. J. Heaviside, R.E. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1883.

---

Synopses of the Results of the Great Trigonometrical Survey of India, comprising Descriptions, Co-ordinates, &c., of the Principal and Secondary Stations and other Fixed Points, of the Several Series of Triangles, as follows;—

- Volume I. The Great Indus Series, or Series *D* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. II. The Great Arc—Section  $24^{\circ}$  to  $30^{\circ}$ , or Series *A* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. III. The Karáchi Longitudinal Series, or Series *B* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. IV. The Gurhágárh Meridional Series, or Series *F* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. V. The Rahún Meridional Series, or Series *E* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. VI. The Jogí-Tíla Meridional Series, or Series *G*, and the Sutlej Series, or Series *H* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. VII. The North-West Himalaya Series, or Series *C* of the North-West Quadrilateral, and the Triangulation of the Kashmir Survey. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.

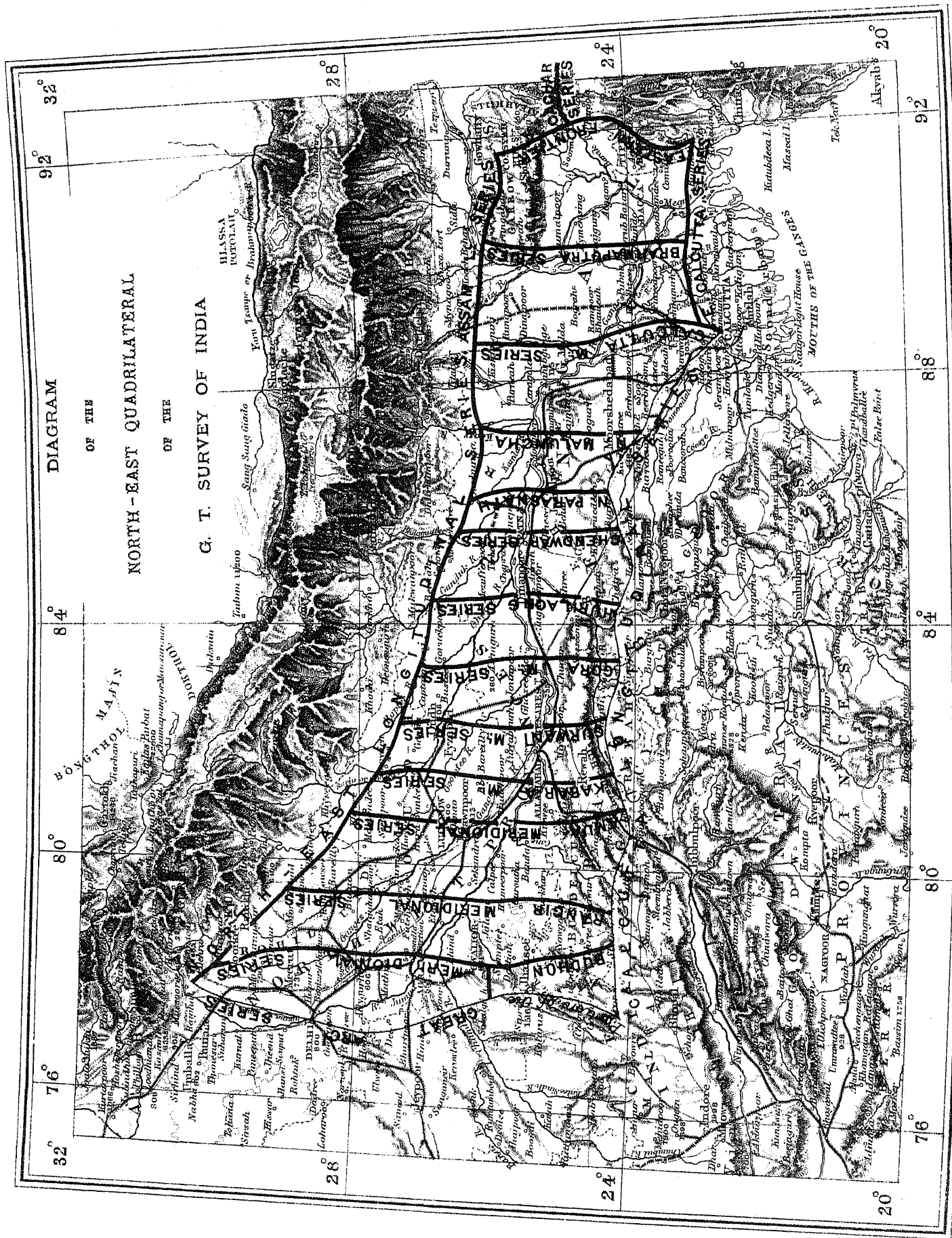


*List of Published Works of the Great Trigonometrical Survey of India—(Continued).*

Synopses of the Results of the G. T. Survey of India, &c.—(Continued).

- Volume VIII. The Great Arc—Section  $18^{\circ}$  to  $24^{\circ}$ , or Series *A* of the South-East Quadrilateral.  
By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Superintendent of the Survey,  
and his Assistants. Dehra Dún, 1878.
- Do. IX. The Jabalpur Meridional Series, or Series *E* of the South-East Quadrilateral.  
By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and  
Superintendent of the Survey, and his Assistants. Dehra Dún, 1878.
- Do. X. The Bider Longitudinal Series, or Series *D* of the South-East Quadrilateral.  
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of  
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XI. The Biláspur Meridional Series, or Series *F* of the South-East Quadrilateral.  
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of  
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XII. The Calcutta Longitudinal Series, or Series *B* of the South-East Quadrilateral.  
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of  
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XIII. The East Coast Series, or Series *C* of the South-East Quadrilateral. By Major-  
General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and  
Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XIV. The Budhon Meridional Series, or Series *J* of the North-East Quadrilateral.  
By Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General  
of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1883.

*February, 1883.*



SYNOPSIS OF THE RESULTS OF THE OPERATIONS OF  
**THE GREAT TRIGONOMETRICAL SURVEY OF INDIA**  
VOLUME XVI.

---

DESCRIPTIONS AND CO-ORDINATES  
OF THE  
PRINCIPAL AND SECONDARY STATIONS AND OTHER FIXED POINTS OF  
**THE AMUA MERIDIONAL SERIES**  
*OR SERIES L*  
**AND THE KARARA MERIDIONAL SERIES**  
*OR SERIES M*  
OF THE  
**NORTH-EAST QUADRILATERAL.**

---

BY LIEUT.-GENERAL J. T. WALKER, C.B., R.E., F.R.S., &c., &c.,  
SURVEYOR GENERAL OF INDIA, AND SUPERINTENDENT OF THE TRIGONOMETRICAL SURVEY,  
AND HIS ASSISTANTS.



Dehra Dun:

PRINTED AT THE OFFICE OF THE TRIGONOMETRICAL BRANCH, SURVEY OF INDIA.

B. V. HUGHES.

1883.



AMUA MERIDIONAL SERIES.KARARA MERIDIONAL SERIES.

|                                               |     |     |    |    |    |    |    |                |
|-----------------------------------------------|-----|-----|----|----|----|----|----|----------------|
| Introduction                                  | ..  | ..  | .. | .. | .. | .. | .. | III— <i>M.</i> |
| Alphabetical List of Principal Stations       | ..  |     | .. | .. | .. | .. | .. | I— <i>M.</i>   |
| Numerical                                     | do. | do. | .. | .. | .. | .. | .. | 2— <i>M.</i>   |
| Description of Principal Stations             | ..  | ..  | .. | .. | .. | .. | .. | 3— <i>M.</i>   |
| Addendum to Description of Principal Stations | ..  |     | .. | .. | .. | .. | .. | 11*— <i>M.</i> |

*KARARA MERIDIONAL SERIES—(Continued).*

|                                                                                                            | PAGE          |
|------------------------------------------------------------------------------------------------------------|---------------|
| Principal Triangles .. .. .                                                                                | 11— <i>M.</i> |
| Secondary Triangles connecting Principal-Auxiliary Stations and Intersected Points ..                      | 15— <i>M.</i> |
| „ Allahabad Series .. .. .                                                                                 | 16— <i>M.</i> |
| Azimuths of Surrounding Stations and Points, at Principal, Principal-Auxiliary and Secondary Stations .. . | 21— <i>M.</i> |
| Co-ordinates and Descriptions of all Stations and Points .. .. .                                           | 26— <i>M.</i> |

CHART

## ERRATA ET ADDENDA.

## AMUA MERIDIONAL SERIES.

| PAGE          |                              |           |            |
|---------------|------------------------------|-----------|------------|
| 13— <i>L.</i> | triangles No. 64 and 65      | }         |            |
| 15— <i>L.</i> | col. 1, line 14 from bottom  |           |            |
| 16— <i>L.</i> | „ 3, lines 2 and 18 from top |           |            |
| 17— <i>L.</i> | „ 3, line 10 from bottom     |           |            |
| „             | „ 1, „ 14 „                  | „ 4       | „ 2        |
| 18— <i>L.</i> | „ 3, „ 15 from top           | „ Jalhotr | „ Jhalotar |

## KARARA MERIDIONAL SERIES.

|                |                                |                          |                           |
|----------------|--------------------------------|--------------------------|---------------------------|
| vii— <i>M.</i> | footnote, line 3 from bottom   | for Chapter II, Vol. II, | read Chapter IV, Vol. II, |
| 17— <i>M.</i>  | triangles No. 104 and 105      | „ Ganges River No. 2 s.  | „ Jumna River No. 2 s.    |
| „              | „ 105, 106 and 107             | „ „ No. 4 s.             | „ „ No. 4 s.              |
| 22— <i>M.</i>  | col. 1, line 20 from top       | }                        |                           |
| „              | „ 3, „ 3 „                     |                          | „ „ No. 2 s.              |
| „              | „ 3, „ 4 „                     |                          | „ „ No. 4 s.              |
| „              | „ 5, „ 1 „                     | „ „ No. 2 s.             | „ „ No. 2 s.              |
| „              | „ 5, „ 3 „                     | }                        |                           |
| „              | „ 5, „ 20 „                    |                          | „ „ No. 4 s.              |
| „              | „ 5, „ 21 „                    |                          | „ „ No. 2 s.              |
| 23— <i>M.</i>  | „ 5, „ 7 from bottom           | „ „ No. 4 s.             | „ „ No. 4 s.              |
| 29— <i>M.</i>  | „ 2, „ 6 from top              | „ „ No. 2 s.             | „ „ No. 2 s.              |
| „              | „ 2, „ 16 „                    | „ „ No. 4 s.             | „ „ No. 4 s.              |
| 33— <i>M.</i>  | „ 1, lines 4 and 9 from bottom | „ Mariae                 | „ Mariaun                 |

February, 1883.

J. B. N. HENNESSEY,  
In charge of Computing Office.

## REFERENCES.



The abbreviations employed in the text are as follows:—

h.s. denotes hill station secondary

s. „ station secondary

These abbreviations are only placed after stations where a theodolite has been set up and observations taken to surrounding points.

The latitudes and longitudes of all points shown on the Chart at the end of each series will be found in the text. The latter exhibits numerical values of triangles only to points of a superior class, to which alone, if exhibited on the Charts, lines are drawn: the lines are either continuous throughout, or dotted for half the length and continuous for the other half: the dots indicate that the bearing was not observed, and in such cases numerical values of azimuths are not given. For other points, difficult to identify or of comparatively less accuracy, numerical values of triangles or azimuths are not given.

*February, 1883.*

J. B. N. HENNESSEY,  
*In charge of Computing Office.*



# PREFACE.

The Amúia and the Karára Meridional Series are the third and the fourth meridional series from the west of the sixteen chains of triangles included in the Section of the Principal Triangulation of the Survey of India which has been named the North-East Quadrilateral. This Section embraces the area within the Meridians of  $78^{\circ}$  and  $92^{\circ}$  and the Parallels of  $23^{\circ}$  and  $30^{\circ}$ ; and for reasons explained in Section 7 of Chapter I of Volume II of the *Account of the Operations of the Great Trigonometrical Survey*, its general reduction was postponed till that of the neighbouring Quadrilaterals, viz., the North-West and South-East, had been completed, whereby two of the Series, the Great Arc, Section  $24^{\circ}$  to  $30^{\circ}$ , and the Calcutta Longitudinal, entering the periphery of the North-East Quadrilateral, became finally fixed. The general principles of the Simultaneous Reduction, and the procedure followed in carrying it out, are the same as have been explained in Volume II of the *Account of the Operations, &c.*, and full details of the whole of the principal triangulation which is at present included in the Quadrilateral, will be found in Volumes VII and VIII of the *Account of the Operations, &c.*

As however the entire contents of the volumes of the principal triangulation are not needed by geographers and surveyors, and moreover as these volumes give no details of the secondary triangulation—which is of considerable value for local requirements—it is obviously desirable that synopses of the final results of the whole of the operations, including the secondary as well as the principal triangulations, should be published for general use, in such a form as to be most suitable for convenience of reference. This has already been done as follows;—

- I. Great Indus Series.
- II. Great Arc, Section  $24^{\circ}$  to  $30^{\circ}$ .
- III. Karáchi Longitudinal Series.
- IV. Gurhagarh Meridional Series.
- V. Rahún Meridional Series.
- VI. Jogí-Tíla and Sutlej Series.
- VII. North-West Himalaya Series.

For those also of the South-East Quadrilateral, viz.,

- VIII. Great Arc, Section  $18^{\circ}$  to  $24^{\circ}$ .
- IX. Jabalpur Meridional Series.
- X. Bider Longitudinal Series.
- XI. Biláspur Meridional Series.
- XII. Calcutta Longitudinal Series.
- XIII. East Coast Series.

And for the following Series of the North-East Quadrilateral,

- XIV. Budhon Meridional Series.
- XV. Rangír Meridional Series.

Already published.

The present is the 16th Synoptical Volume and the third of those appertaining to the North-East Quadrilateral; and it has been made to include both the Amúia and the Karára Meridional Series, partly because portions of the same districts enter both series and it is therefore convenient to have all the results in one volume, and partly because the available matter is insufficient for two volumes.

It gives the results of the whole of the triangulation executed in connection with these series, both the principal, which was executed with theodolites having azimuthal circles of 15 and 18 inches in diameter read by 3 micrometer microscopes, and the secondary, which was executed with smaller theodolites read by verniers.

By the process of reduction which has been followed the principal triangulation has been rendered perfectly consistent, both internally and externally; internally, so that if in any one of the several polygonal figures of which the chains may be composed, calculations are carried from one station to another in every possible direction, the same results will be inevitably deduced; and externally, so that the values of the co-ordinates of any station, when computed from the given co-ordinates of any other station, with the final linear and angular data, will be the same, whether the calculation is carried directly through the series, or circuitously through any of the other chains of triangles comprising the North-East Quadrilateral. All secondary triangulations which emanate from one side of the principal series and close on another side thereof, or on a contiguous series, have also been made consistent throughout.

As regards the general arrangement of this volume, it is necessary to point out that the several sections have been prepared and printed at different times, and that the work has extended over several years. The Introductions to each series and the Names and Descriptions of the Principal Stations were originally prepared for Volume VII of the *Account of the Operations, &c.*, and when a sufficient number of copies had been printed for that work, additional copies were struck off for the present Synopsis. The Alphabetical and Numerical Lists of Principal Stations, pages 1—*L.* and 2—*L.*, and 1—*M.* and 2—*M.*, as well as the Names and Descriptions of the Principal Stations of the Amúia Series, pages 3—*L.* to 8—*L.*, were printed prior to the year 1868, when the general programme for the final reduction of the whole of the Triangulation of India was drawn up; there was then a long pause in the printing, while the Simultaneous Reductions of the North-West, South-East and North-East Quadrilaterals were being completed; this was done by the year 1877, when the secondary triangulation was adjusted in accordance with the principal, and then the printing of this volume was resumed.

The paging of each series starts from unity and is therefore not continuous throughout this volume. This was necessitated by the order of routine which had to be adopted in printing the successive subjects embraced in each and which is the same for all. The paging of each series is however distinguished by using a capital letter as a subscript to the numerals; thus all the paging which has reference to the Amúia Meridional Series has the subscript *L.*, and that to the Karára Meridional Series the subscript *M.*

The data given in this volume are the following:—

*First* (pages 1—*L.*, 1—*M.*), alphabetical lists of the names of the principal stations, showing the numbers assigned to them, which were employed in the reductions as being more convenient to use than names.

*Second* (pages 2—*L.*, 2—*M.*), numerical lists giving the names corresponding to the numbers.

*Third* (pages 3—*L.*, 3—*M.*), descriptions of the principal stations—of their structure and positions—as taken from the original records of the observations, and supplemented by Addenda (pages 9\*—*L.*, 11\*—*M.*) giving the most recent information of their condition which has been received up to date.

*Fourth* (pages 9—*L.*, 11—*M.*), the angles and sides of the principal triangles, numbered and arranged in order from south to north.

*Fifth* (pages 12—*L.*, 15—*M.*), the angles and sides of certain secondary triangles. The numbering is here made consecutive to that of the principal triangles, in order to facilitate references which are made in other sections to the place where the length of a side is to be found.

*Sixth* (pages 14—*L.*, 21—*M.*), the azimuths of surrounding stations and points, at principal, principal-auxiliary, and secondary stations, the latter arranged in alphabetical order.

*Seventh* (pages 17—*L.*, 26—*M.*), the co-ordinates and descriptions of all stations and points arranged in alphabetical order.

The heights of the stations of the Amúia Meridional Series depend in the first instance on the finally determined values of the stations of Amúia and Lakanpúra of the Calcutta Longitudinal Series (of the South-East Quadrilateral), and on the spirit-leveled heights of two stations of the North-East Longitudinal Series, *viz.*, Kutia and Rámnagar, whilst those of the Karára Meridional Series depend on the finally determined values of the stations

of Karára and Marwás of the Calcutta Longitudinal and of Mási of the North-East Longitudinal Series. In addition to these fixed heights, the heights of Stations XVIII, XXVIII, XXIX and XXX of the Amú Meridional Series, and the heights of Stations XVI, XVII, XXX, XXXI and XXXII of the Karára Meridional Series were determined by the Spirit-leveling Operations of this Branch of the Department, and those of Stations XI, XIII and XX of the first named series and of Stations XIX, XX, XXIII, XXVI, and XXVIII of the latter series were determined by similar operations of the Revenue Branch. The manner in which the heights of the remaining stations have been made to accord with those above designated, is explained in Section 7 of Chapter II, Part I of Volume VII of the *Account of the Operations, &c.* The datum to which all heights have been referred is the mean sea level of Karáchi (Kurrachee). It may be here stated that all trigonometrically determined heights invariably refer to the upper surfaces of the central masonry pillars which are constructed for the instruments to stand on. Spirit-leveled values sometimes refer to the upper surface and sometimes to the basement of the pillar, whichever the leveling staff was set on; a description of the exact point referred to is given in each instance in footnotes to the pages of the Co-ordinate Lists, commencing on pages 17—*L*. and 26—*M*. respectively.

It has not been considered necessary to publish the whole of the details of the secondary triangulation, portions having been executed originally for preliminary geographical purposes, to facilitate the construction of a first map of India, and the objects observed having in many instances been flags and temporary marks which must long since have disappeared. The sides and angles of 31 triangles for the Amú Meridional Series and of 133 triangles for the Karára Meridional series, which were selected as most likely to be still in existence and of future use, and the azimuths of all these sides, have been given; but for a number of other points the co-ordinates only have been given. With the aid of Nos. X, XI and XII of the *Auxiliary Tables to facilitate calculations of the Survey Department of India*, Dehra Doon 1868, local surveyors, working on a system of rectangular co-ordinates, can readily transform the spheroidal co-ordinates here given to suit their own requirements.

The Longitudes depend on an astronomically determined value of the longitude of the Madras Observatory,  $80^{\circ} 17' 21''$ , which was deduced about the year 1815. There has long been reason to believe that this value was about  $3'$  too great; but, pending the final determination of the longitude of the Madras Observatory, it has not been considered desirable to alter the value, which has therefore been maintained up to the present time. An electro-telegraphic determination of the longitude of Madras from Greenwich, commencing with the difference between Suez and Greenwich—determined, in 1874, under the superintendence of the Astronomer Royal—was completed in 1877 by the determination of the difference between Suez and Madras, by Captains Campbell and Heaviside, as a part of the operations of this Survey. The combined result places the Observatory at Madras in Long.  $5^{\text{h}} 20^{\text{m}} 59^{\text{s}} 42'' = 80^{\circ} 14' 51'' 30$ . Thus the following precept may be accepted with considerable confidence,—

**All the values of longitude in this volume require a constant correction,  
probably of  $-2' 30''$ .**

As regards the orthography of Indian names in the present volume. The Alphabetical and Numerical Lists of Principal Stations, at the commencement of the volume, were printed before the year 1868, in accordance with the rules introduced by Colonel Everest for use in the Survey Department. Subsequently, in 1874, several provincial lists of spellings, constructed under the immediate orders of the Government of India, were received; and thereafter the newly authorised spellings were adopted for all names and other words contained in these lists; but for words for which there was no specific authority, the spellings have been framed in accordance with the methods followed in the preparation of the published lists, reference being made in the present instance more particularly to the Gazetted Lists for the North-West Provinces and Oudh. As a general rule the pronunciations of the vowels are as follows:—*a* has a variable sound as in woman, rural, paltry; *á* as in tartan; *i* as in bit; *í* as in ravine; *u* as in bull; *ú* as in rural; *o* as in note; *e* as *a* in say; *au* as *ou* in cloud; *ai* as *i* in ride.

The Charts accompanying this volume show the whole of the principal stations and triangulation, the positions of all the secondary points, and those portions of the secondary triangulations of which full details of the angles, sides and azimuths are given. With the aid of the Charts it is hoped that little difficulty will be met with in finding out any of the data which may be required. The descriptions of the secondary stations are in some cases

not as full and clear as is to be desired: this arises from the inadequacy of the information entered on the spot by the surveyors in their field books; every effort has been made to supplement the field books, whenever it was found practicable to do so, in order to facilitate the future identification of the stations; all the information which is forthcoming has now been given.

The general arrangement of this volume and the preparation of the data which it contains have been the work, at different times, of Mr. Hennessey, M.A., F.R.S., Major Herschel, R.E., F.R.S., and Mr. Cole, M.A. Major Herschel moreover supervised the Simultaneous Reduction of the North-East Quadrilateral of which these Series form a portion, while the Introductions to them were written by Mr. C. Wood, Surveyor 2nd Grade. Great pains have been taken to secure the utmost accuracy in preparing the data and passing them through the press.

CALCUTTA,  
February, 1883. }

J. T. WALKER, LIEUT.-GENERAL, R.E.,  
*Surveyor General, and Superintendent of the  
Great Trigonometrical Survey of India.*

**AMUA MERIDIONAL SERIES.**



AMUA MERIDIONAL SERIES—(LONG.  $80^{\circ} 32'$ ).

## INTRODUCTION.

The Amua Series is the third in order, reckoning from west to east, of the meridional chains of triangles included in the North-East Quadrilateral. It follows, as closely as the nature of the country traversed would admit of, the meridian of  $80\frac{1}{2}^{\circ}$  East Longitude. It was begun contemporaneously with the series immediately to the westward—the Rangir—and was executed throughout its length as a single chain of triangles. It emanates in the Native State of Nagode and the modern district of Jubbulpore, at the side Amua-Lakanpura of the Calcutta Longitudinal Series; and for the first  $1\frac{1}{2}$  degrees of its length, it is carried across the hills which, generally speaking, may be said to form the outliers of the Great Vindhya Range—the southern watershed of the Gangetic plain. In this section, the Series traverses the Native States of Panna and Chhatarpur at the south-east extremity of Bundelkhand, the states reckoned under the political control of the Baghelkhand Agency, and the British district of Banda; and the triangulation fixes the important towns of Maihar and Panna, the capitals of the Native States respectively so named. It then descends into the valley of the Jumna; and, passing through the Fatehpur and Cawnpore districts in the Doab, strikes the right bank of the Ganges in parallel  $26\frac{1}{2}^{\circ}$  N. lat.: in this section, it fixes the position of the towns of Banda and Cawnpore. The Series, after crossing the Ganges, is carried through the north-western portion of Oudh, traversing the modern districts of Unao, Lucknow, Hardoi, Sitapur and Kheri, and is now held to terminate at the side Kokra-Dahlelnagar (xxiii-xxv) of the North-East Longitudinal Series; but it also furnished the two triangles north of this side which have been incorporated in the former series. It was brought to a close in the year 1838-39. Its direct length is 282 miles, covering 4 meridional degrees.

The execution of this Series was entrusted to Lieutenant T. Renny of the Bengal Engineers, who had shortly before been appointed to the Great Trigonometrical Survey, on the recommendation of the Surveyor General, Major Everest, by a General Order in the Military Department dated 23rd July 1832. Lieutenant Waugh, of the Bengal Engineers, was also appointed to the Department about the same time. Both officers were then in Calcutta; they were directed to proceed to Central India to acquire an insight into their new duties by sharing in the operations which were then being carried out on the extensive chain of triangles

known as the Great Arc, under the immediate superintendence of Major Everest. But as in marching from Calcutta to Central India they would have to pass through a region of which it has been said that as little was then known “as of the heart of Africa”, Major Everest instructed them to carry a route-survey through this region and draw up a report of it for submission to the Government. Extracts of his instructions—which are interesting for the evidence they furnish of the urgent demand then existing for every sort of information obtainable for immediate geographical requirements—will be found at pages IV—K and V—K of the Introduction to the Rangir Meridional Series.

With two European Assistants; a native establishment consisting of a nucleus of 24 flagmen, 23 carriers for the large theodolite, 1 native doctor, and 2 harkáras (letter carriers), also 1 havildár, 1 náib, and 12 barkandázes for the protection of the instruments and Government property, and about 130 others for general employment; also with 50 head of baggage cattle, and an

Season 1833-34.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 2nd Assistant.  
Mr. R. C. Tulloh, 3rd Class Sub-Assistant.  
„ C. Lane, 3rd „ „

elephant for the office tent,—Lieutenant Renny started from Agra on the 30th November 1833. He was furnished with an 18-inch theodolite\* (No. 1) by Troughton and Simms for the principal observations, and such other instruments as were needed for the preliminary operations. The party marched to its ground *viâ* Gwalior, Datia, Jhânsi and Saugor in company with the party which was proceeding under Lieutenant Waugh to the Rangir Series. The co-operation of the Governor General's Agent in Bundelkhand as well as of the Political Agent for Baghelkhand having been secured, an escort of a duffadár's party of horse and a náik's party of foot was obtained at Saugor. The party reached its first station, Amua (xvii, of the Calcutta Longitudinal Series), on the 13th January 1834.

There Lieutenant Renny commenced operations by taking a series of circumpolar star observations for azimuth; his assistants were detached to select forward stations, and while he remained at Amua, he took observations to such hills in the distance as appeared to be suitable for eventual adoption as principal stations. The selection of stations in the direction of the meridian of Amua proved however to be a very difficult matter, because of an elevated table land in front, which was covered with low forest and jungle and could only be crossed by having towers of considerable height built at the stations of the triangulation and clearing the rays between them, as in the plains. After carefully reconnoitering the ground, Lieutenant Renny decided on giving the Series a bend to the east, avoiding the table land and entering a tract of country which presented fewer difficulties, and had the further advantage of enabling him to place his stations “in a cultivated tract rather than on jungly flats.” Sending Mr. Tulloh to the Kaimûr range—where he fixed the station of Patra (ii),—and Mr. Lane to the hill of Dharkána (iv), he himself returned to Lakanpura (xix, of the Calcutta Longitudinal Series) and on 20th February began and completed the measurement of the angle between Amua and Maihar (i). Lieutenant Renny next explored the country to the north-east, and proceeded *viâ* Dharkána (iv) to the Vindhyaçal range, selecting Sârang (vi) and Dâgri (v) stations near the northern confines of Baghelkhand and bringing the Series

\* For the history and description of this instrument, see page 65 of Appendix No. 2 to Vol. II. of the *Account of the Operations of the Great Trigonometrical Survey of India*.



back to its own meridian. Mr. Tulloh having succeeded in selecting a station in the plains, proceeded to select the stations of Kartár (vii), Marpha (viii), and Sihonda (ix) which are situated in the Banda district. Lieutenant Renny now considered that his presence was no longer needed on the approximate series, and accordingly returned to resume the final observations, selecting *en route* the station of Potenda (iii). He began observations on the 19th March at Maihar (i); and proceeding thence in order to Amua, Lakanpura, Patra (ii), Potenda (iii), Dharkána (iv), Sárang (vi), Dágri (v), Marpha (viii), Kartár (vii), Sihonda (ix), and Pavia (x), he was able by 23rd June to complete the first ten triangles of the Series, thereby spanning a *meridional* distance of 100 miles and reaching the extremity of the hill tract through which the Series passes.

Lieutenant Renny had hoped to have a large amount of secondary triangulation executed in connection with the principal operations by one of his assistants. The country passed through possesses many places of considerable interest, prominent among which are the celebrated forts of Ajaigarh and Kalinjar which date back for their origin to the Chandel rule nearly 1000 years ago, and the fancied impregnability of whose walls induced their defenders to defy to some purpose even the British arms in the early portion of the present century; Nagode or Unchehra, a rája of which subsequently proved his loyalty by spontaneous support in the critical times of the Indian Mutiny; Panna, a place of considerable beauty and wealth; Maihar, Kothi and Soháwal, all the capitals of the Native States or *jagírs* named after them; and Chitarkot, a notable place of pilgrimage and boasting a sanctity the date of whose origin is lost in the mythical ages of Hindu legendary lore. But in these years the supply of instruments was very inadequate for the requirements of the Survey Department. Lieutenant Renny applied more than once to the Mathematical Instrument Office in Calcutta for a small theodolite for the execution of the proposed secondary triangulation, but on each occasion his application could not be complied with; and late in the season, when the 7-inch theodolite which was employed in the preliminary site selection became available for the secondary triangulation, the hot winds were setting in and the atmospheric conditions were such as to make observing impossible, otherwise than to luminous signals, which were only sufficiently numerous to be employed in the principal triangulation. Thus the secondary determinations, this season, were almost wholly restricted to such as could be made from the principal stations.

Towards the end of the season the approximate series passed out of the hill tracts into the plains. The cutting of lines to clear the rays between the stations became necessary. This at first aroused much opposition on the part of the villagers, and retarded the progress of the operations until such time as the District Officers were able to interfere. Further inconvenience was caused by the people of the country in digging up and carrying away the mark-stones, about which they appear to have entertained superstitious misgivings.

Lieutenant Renny continued his operations into the middle of June, when sickness broke out among the natives in his camp from constant exposure to the vicissitudes of the climate, the rainy season having now commenced. Earnestly commending his last four stations to the care of the Collector of Banda, he turned his steps towards the recess quarters at Cawnpore, which he reached on the 1st of July.

During the recess of 1834, Lieutenant Renny received full instructions from the Surveyor General regarding a new system of selecting stations

Season 1834-35.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant.  
Mr. R. C. Tulloh, 3rd Class Sub-Assistant.

„ C. Lane, 3rd „ „

in the plains by, what was called, ray-tracing, which was to be adopted for laying out the triangulation in advance, and which consisted in running a traverse with a small theodolite and perambulator in the required direction, and

as nearly as possible in a straight line, as described at page 41 of Vol. II. The operations of the ensuing field season were solely directed to the selection of stations, and no principal triangulation was attempted, as Lieutenant Renny's services were required elsewhere for the greater portion of the field season, in assisting at the measurement of the Dehra Dún Base-Line. Leaving in the Ordnance dépôt at Cawnpore his large theodolite and such of his equipment as was required for the principal observations, Lieutenant Renny took the field with his party on the 13th of October. Happily he had at last succeeded in obtaining a second small theodolite, now indispensably necessary for the ray-tracing and other preliminary operations. After fairly starting the work of the field season, he proceeded by dāk to Dehra Dún, where he remained until the end of April, when the measurement of the base-line was completed; he then marched down country to rejoin his party, which he reached early in June, and found still at work on the Gangetic plains between Cawnpore and Lucknow.

The operations had unfortunately been greatly retarded for want of sufficient authority from the Government to support the surveyors in the necessary operations of cutting down all trees and removing all obstacles on the lines between the principal stations. Hitherto the District Officers had generally been ready to aid the surveyors by giving the requisite instructions to the local native officials to co-operate to such extent as might be necessary, and more particularly to assist the surveyors in ascertaining the owners of the removed trees and other obstacles and in estimating the proper amount of compensation to be paid them. But the Collector of Cawnpore, considering that the aid required of him far exceeded his powers to grant, referred the matter to the Commissioner of the Division, by whom it was forwarded for orders to the Secretary to Government in the Judicial Department. The reply was such as to paralyze, for a time, all vigorous prosecution of survey work. The Vice President in Council ruled that “The Officers in charge of the Trigonometrical Survey are not authorized to remove trees or other property without the sanction of the owners previously obtained, and it will rest with those officers to offer such remuneration as will induce the owners to comply with their wishes.” Now in order that the principal triangulation might be advanced at a fairly rapid rate, it was necessary to lay out and complete at least ten new triangles in the course of each field season; the sides of the triangles being of an average length of 14 miles, the clearing of at least twenty perfectly straight 14-mile lines was essentially necessary, and it was generally desirable that this work should be completed during the first half of the field season, so as to allow of the final observations being taken during the remainder of the season. To have raised the tower stations sufficiently high to overlook all intermediate obstacles would—as previous experience had shown—have much retarded, and increased the cost of the operations. Thus line clearing was absolutely necessary; but obviously a number of perfectly straight lines—of an aggregate length of, say, 280 miles—could not be

cleared without cutting down a considerable number of trees, more or less valuable; and if this might not be done without obtaining the sanction of the owners in every instance, the operations would be liable to be so enormously retarded, that they would have to be abandoned. The Surveyor General pointed out these facts to the Government, and prayed for the immediate issue of such orders as would effectually remove the evil. It was then ruled that “the *Tehsildár* or *Peshkár* or other native officials of the district, should invariably accompany “the surveyors, on the grounds that their presence will no doubt, from their superior knowledge “of the inhabitants and of the value of the property, greatly facilitate and expedite agreements “for permission to remove such trees as may interrupt the operations of the survey.” This arrangement had the desired effect, by investing the operations of the surveyors with sufficient authority to silence all further opposition.

By the operations of the present season, the Series stood practically laid out to a little beyond the parallel of  $27^{\circ}$  in N. lat., having been carried through that portion of Oudh which lies south of the river Gumti. Some delay had occurred in obtaining the requisite authority to carry the operations into the Oudh territory; but the most serious obstacle to progress was the action of the Collector of Cawnpore as already described; thus the out-turn of work was less than Lieutenant Renny had expected his two assistants to accomplish in his absence. Stations were selected over a direct meridional distance of 120 miles, involving the execution of over 250 miles of ray-tracing by the route-survey method.

Before the recess of 1835, Mr. Tulloh resigned his appointment in the Survey Department. No other assistant was available to take his place

Season 1835-36.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant.  
Mr. O. Lane, 2nd Class Sub-Assistant.

until towards the close of the following field season. Lieutenant Renny took the field earlier than usual in order to make up as well as he could both for the backwardness

in the state of the ray-clearing and for the diminished strength of his party. He took care also to pave the way for an uninterrupted prosecution of the work in prospect by sending copies of the recent orders of Government, on the subject of cutting trees, to the several Civil officials. His progress was accordingly uninterrupted; but the want of a second assistant was much felt, now that all opposition was at an end and the operations could be carried on with vigour. Lieutenant Renny brought several old mud forts into use, by repairing and raising their bastions so as to convert them into principal stations, in doing which he was always careful to fix the lower centre mark in a solid portion of the original structure. Further, as regards the question of the advantages of lofty and expensive towers without line cutting, relatively to low and cheap towers with line cutting—which was still a moot point—Lieutenant Renny found that he could construct towers of earthwork and sundried bricks set in mud, 25 feet high, 16 feet square above and proportionately larger below, with mark-stones at intervals from the basement to the upper surface, at a cost not exceeding Rs. 3 for each foot of height, that is to say for less than Rs. 100 for the highest tower that it was found necessary to erect\*. The average cost of clearing the lines between the stations was also found not to exceed Rs. 100, including the

---

\* For details regarding the construction of these towers, see note on page 13 of Part I of Volume VII.

payment of compensation to the owners of the trees felled on the lines\*. Thus the cost of each new tower station and of clearing the two rays leading to it did not exceed Rs. 300; whereas a tower sufficiently high to overlook all obstacles on the lines must have been built of the best masonry, and would probably have cost not less than Rs. 2,000; and the time occupied in its construction would have much exceeded what was required for building the simpler structures designed by Lieutenant Renny, and for clearing the rays between them.

Lieutenant Renny cleared the rays up to the side Barauli-Nimkár (xxv-xxvi), and then proceeded with the selection of the stations remaining to complete the Series up to the northern confines of the Oudh territory. And as permission to enter Nepal was withheld by the Government of India, of whom it had been solicited, the selection of stations was brought to a close at the side Rámuápur-Rámnagar (xxii-xxiv) of the North-East Longitudinal Series. During the latter end of April, the party was strengthened by the arrival of Mr. C. Murphy, 2nd Class Sub-Assistant, transferred from the operations on the northern section of the Great Arc, too late however to be of much help during the present field season. Writing from Cawnpore on 3rd June, Lieutenant Renny reported that he had continued clearing the rays between the stations, as long as the atmosphere was sufficiently clear to enable him to see the blue-lights which were burnt at the forward stations, to indicate their position; these blue-lights, when burnt on lofty poles, were usually visible over all intermediate trees and obstacles at the back stations, more particularly if observed at midnight, when very considerable refraction is generally prevalent; their employment thus frequently enabled the required direction of a ray to be exactly determined, without any other procedure; but as this method of operation was not always to be relied on, and depended for its success very much on the condition of the atmosphere, it was eventually superseded by ray-trace triangulations—described at page 42 of Volume II—which, though sometimes more laborious, were always feasible and certain in their results. Lieutenant Renny's subsequent operations, after finding further ray-clearing impossible, are quoted as follows from his report to the Surveyor General. "I conducted a route-survey for the selection of points for principal stations up to the Nepal Hills. At this period, being the middle of last month, fever and other complaints prevalent in the Tarái broke out in my camp, and before I had returned to Sitapur both my Sub-Assistants were dangerously ill, and a great portion of my establishment laid up. As the dimness of the atmosphere at this season would have prevented me doing any more work until the commencement of the rains, and to detain my establishment in camp would only have been exposing them to relapses, I proceeded here as soon as my party was sufficiently convalescent to travel, and am happy in being able to state that my Sub-Assistants are now out of danger, and the Native establishment daily acquiring strength."

The operations of the season enabled Lieutenant Renny to construct two general maps of the country in which the operations had been carried on, compiled from information acquired in the course of the route-survey ray-traces between the principal stations.

---

\* The compensation paid for trees felled on sixteen rays in the Oudh territory was under Rs. 70 per ray on the average; the amount of this award was fixed by an official of His Highness the King of Oudh who had been specially deputed to accompany the party.

The party resumed field operations on the 1st October, Lieutenant Renny commencing operations by taking observations at the station of Jájmau (xviii) which was only 4 miles distant from his recess quarters at Cawnpore, to the three stations, xvi, xvii and xix, at which towers had already been built. He proceeded thence to Máwa (xvi), where he found it necessary to give an addi-

*Season 1836-37.*

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant.  
Mr. C. Murphy, 2nd Class Sub-Assistant.  
„ C. Lane, „ „

tion of 6 feet to the height of the tower; observing there both by day and night\*, he was able by the 17th of the month to complete all the observations, horizontal as well as vertical. The next points visited were the hill stations of Sihonda and Pavia (ix and x) which form the side of continuation of the triangulation completed in the first field season; the single angle remaining to be observed at Sihonda (ix) was completed; at Pavia (x) the angle between Sihonda (ix) and Paprendi (xi) was partially observed, the remaining angle being wholly unobserved because the signal at the tower station at Músapur (xii) was invisible. The observation of the principal angles was then discontinued, as the sides of the triangles were of so great a length for operations in the plains that it appears to have been considered hopeless to attempt to measure them until the season of clear atmosphere which occurs during and shortly after the monsoons.

Having deposited in store at Cawnpore his large theodolite and such other portions of the materiel as he would not need, Lieutenant Renny devoted the remainder of the season to clearing rays, building new towers and raising the old ones wherever necessary. About 270 miles of rays were cleared, carrying this portion of the work up to the extreme northern limit of the Series; the heights of the towers at xxi, xxiv and xxv were increased 15 feet, 30 feet towers were erected at stations xxvi, xxviii and xxix, and one of 28—subsequently increased to 35—feet at xxvii.

The services of Lieutenant Renny were lost to the party until the 1st of March 1838, being required at the measurement of the Sironj Base-Line.

*Season 1837-38.*

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant.  
Mr. C. Murphy, 1st Class Sub-Assistant.  
„ C. Lane, 1st „ „

Mr. Murphy accordingly took charge at the commencement of the field season, under the general direction of Lieutenant Renny, and proceeded on the 5th October towards Pavia (x) distant about 70 miles from Cawnpore where the recess quarters were established. On his march thither, he ascertained that the mark at Jahánabad station (xv), on the roof of a paka building, had been removed, and that the owners of the building would not allow it to be replaced. This difficulty was however got over with the assistance of the Magistrate of Fatehpur without retarding the progress of the work. Mr. Murphy arrived at Pavia (x) on the 14th October; and by the 20th he was able to complete all observations of horizontal angles which he believed to be necessary; the vertical angles were not observed as the signals were only visible during the night when refracted very considerably and very irregularly, so that the observations would be worthless unless reciprocated by others taken at the same time at the station under observation. The horizontal angles at Paprendi (xi) were then undertaken and completed; afterwards those at Kánákhera

\* The night signals used were either vase-lights or blue-lights, the latter having superseded the former, to be in turn superseded a few years afterwards by powerful lamps with parabolic reflectors.

(xiii) which were all but completed. Mr. Murphy next proceeded to Músapur (xii), where he completed all the horizontal angles in three days, and measured reciprocal verticals with Mr. Lane at Pavia(x), who employed a 7-inch theodolite; these simultaneous verticals were observed on the 4th November to blue-lights, burnt an hour after sunset. Mr. Murphy reached Jáfrabad (xiv) on the 7th November, and by the 11th the three horizontal angles as well as simultaneous verticals on the ray to Músapur (xii) (observed to heliotropes *an hour before sunset*) were measured. The station of Jahánabad (xv) was reached on the 17th: by the 20th the horizontal angles were all disposed of; here simultaneous verticals were observed to lamps on the ray to Jáfrabad (xiv), but though the observations extended over an interval of nearly  $2\frac{1}{2}$  hours beginning at an hour after sunset, the results of the means of the measures differed so considerably *inter se* that they were rejected and reserved for future re-measurement. Mr. Murphy remained at Jahánabad while Mr. Lane was marching to Dewarsán (xvii) for simultaneous verticals; they were taken on the 24th at the time of minimum refraction. Mr. Lane proceeded the same day to Jájmau (xviii), while Mr. Murphy advanced to Dewarsán (xvii), and succeeded on that and the following night in completing the two horizontal angles at this station as well as in taking simultaneous verticals on the ray to Jájmau (xviii) with Mr. Lane. On the completion of the observations at Dewarsán (xvii) Mr. Murphy fell ill, and had to proceed to Cawnpore for three weeks, at the end of which he returned to find that the favorable season for observing had ended. Crossing the Ganges into Oudh he resumed work on the 21st December at the station of Rau (xx), where he also took observations for fixing Christ's Church Cawnpore, which was then being built. He waited there five days without being able to obtain complete measures of even a single horizontal angle, though he succeeded in taking simultaneous verticals with Mr. Lane on the ray to Jájmau (xviii). He then recrossed the river and proceeded to Namána (xix) on the right flank of the Series. The winter rains had now set in, and the conditions of the atmosphere became so unfavorable that though he remained at that station from the 4th to the 28th of January, and worked whenever possible both by day and night, he could only obtain complete observations of two of the three horizontal angles; such few measures as were taken of the third angle were rejected and re-observed later on in the season. Pushing on to Jhalotar (xxi) the horizontal angles occupied him from the 3rd to the 14th of February; and thence returning to Rau (xx)—the observations at which had been left unfinished nearly two months before—he finished the work there by the 19th of February. He then proceeded to Etora (xxiii) where the horizontal observations occupied him from the 24th February to the 3rd March; after this he went to Bakseria (xxii) where by the 8th of the month he had completed the three horizontal angles as well as simultaneous verticals with Mr. Lane on the ray to Rau (xx). At this time Lieutenant Renny returned from the Sironj Base-Line and resumed the direct charge of the operations, examining the work performed by Mr. Murphy, affording him incidental aid in the measurement of the angles at Bakseria (xxii), and accompanying him to his next station Asu (xxiv); there the three horizontal angles as well as the simultaneous verticals on the ray to Bakseria (xxii) were measured between the 10th and 14th of March.

An examination of Mr. Murphy's work brought to light the circumstance that certain of his angles were deficient in respect to the number of zeros on which the measurements

had been taken. Lieutenant Renny reported that otherwise his arrangements for conducting the details of the work both expeditiously and economically appeared to have been very good. That no loss of time might be incurred in returning to observe such zeros of his angles as were deficient, Mr. Murphy volunteered to undertake the work during the ensuing rains, at a season of the year not usually devoted to field operations. Mr. Lane's share of the work was also favorably commented on by Lieutenant Renny.

On leaving Asu (xxiv), the party proceeded successively to Barauli (xxv) and Fatehnagar (xxvii), and by the end of March the three horizontal angles at each of these stations were disposed of.

Lieutenant Renny had meanwhile been apprized by the Surveyor General that his services would shortly be needed in carrying on the triangulation of the Great Arc to the south of Sironj; he was directed to proceed to Head Quarters as soon as his presence could be dispensed with on the Amua Series. He was anxious before leaving the party to establish some sort of check on the work that had been already executed; and for this purpose he determined to measure an azimuth of verification at the station of Nimkár (xxvi). He arrived there on the 2nd of April; and by the 16th of the month he completed the azimuthal observations and the measurement of two of the three horizontal angles at that station. The reduction of the azimuthal observations, and various necessary arrangements for the future conduct of the work, occupied Lieutenant Renny till the 1st of May, when he proceeded to Dehra Dún, marching *vid* Bareilly and Hardwár.

Mr. Murphy, now again left to his own resources, resolved to finish at once the insufficiently measured angles to the south in preference to continuing his progress northwards; for he considered that a severe rainy season might possibly set in, and, by forcing him into recess quarters, prevent him from bridging over the gap that then existed in the work. He accordingly retraced his steps to Namána (xix), where a few months previously he had spent several weeks without the weather admitting of his completing the measures of more than two of the three angles; the third angle was now measured in the course of two days. The party then moved southwards to Pavia (x), where all that remained to be done was the completion of a single angle—between ix and xi—by measures on two zeros: this was effected on the 14th June; and by the 23rd of the same month, the deficiencies in the angles at xi and xiii were also made good. Thus, the Series stood complete up to the side (xxvi)-(xxvii), with the exception of the angle at xxvi (Nimkár) between xxiv and xxv. In addition to the tower-building already indicated, seven new tower stations, each 24 feet high, had been constructed at the northern end of the Series, thereby completing this troublesome portion of the operations.

During the field season of 1838-39 Lieutenant Renny merely exercised a general

Season 1838-39.

PERSONNEL.

Lieut. T. Renny, Bengal Engineers, 1st Assistant.

Mr. C. Murphy, 1st Class Sub-Assistant.

„ C. Lane, 1st „ „

supervision over the operations without taking any personal share in them, as he was engaged on the measurement of the principal angles of the section of the Great Arc, to the south of Sironj, between the parallels of  $18^{\circ}$  and  $24^{\circ}$ .

The programme for this season's operations was as follows:—to measure the horizontal angles at nine principal stations to complete the Series; to observe an azimuth at Rámuápur,

the most northerly station on the Amua meridian, which was subsequently allotted to the North-East Longitudinal Series; and lastly, to take simultaneous vertical angles over a distance of nearly 200 miles in the length of the Series, so as to form a continuous chain of relative heights of which only seven links stood supplied by the observations of the previous season. With favorable weather all this might be completed in one field season.

Mr. Murphy moved into camp on the 15th October; and, having crossed the Ganges into Oudh, he proceeded to his first station, Nimkár (xxvi), where the angle between xxiv and xxv was duly observed on the 21st idem. The party proceeded thence in succession to the several northern stations, the horizontal angles at which were all disposed of by the 9th of December. The prescribed azimuth was then undertaken by observations to  $\delta$  Ursæ Minoris at both elongations. By the end of the month the whole of the programme of work was completed, with the exception of the vertical observations. Mr. Lane had fallen ill at the commencement of the field season, and been unable to render any assistance, in consequence of which Mr. Murphy had engaged the temporary services of Mr. C. D. Campbell, a young candidate for employment in the Survey Department. A collision occurred between the men of the native establishment and a large body of armed men in Oudh—who were said to be desperate freebooters, and inhabited a small fort of their own in a jungle on the banks of the Gumti in the vicinity of the survey operations—which might have been attended with much loss of life had not Mr. Murphy been at hand to interpose and protect his people. But otherwise the operations in Oudh seem to have met with no opposition.

The vertical angles, whose measurement was the one thing remaining to complete the Series, were observed simultaneously at the opposite extremities of the rays, by Mr. Murphy at one end with Troughton and Simms' 18-inch theodolite No. 1—with which the whole of the horizontal angles of this Series were measured—and at the other end by either Mr. Lane or Mr. Campbell with a 7-inch theodolite. These operations were carried, under instruction, over the diagonal sides only of the Series, zigzagging from flank to flank, so as to fix every station in turn, but without giving check determinations on the flank sides as well, as that would have doubled the amount of work to be performed. The field operations were concluded on the 2nd of April. The party then proceeded *viâ* Cawnpore to the Surveyor General's Head Quarters at Dehra Dún.

On the completion of the Simultaneous Reduction of the North-East Quadrilateral, it was found that the errors which had actually been dispersed over the Amua Series, between its origin Amua-Lakanpura and terminus Dahlelnagar-Kokra, were as follows:—

|                                 |                |                               |
|---------------------------------|----------------|-------------------------------|
| In Logarithm of the latter side | + 0.000,0043,8 | = 0.6 inches per mile nearly. |
| „ Azimuth                       | „              | — 1".286                      |
| „ Latitude of Dahlelnagar       | + 0.077        |                               |
| „ Longitude                     | „              | — 0.173                       |

The trigonometrical heights were checked at several points in subsequent years by connection with the Spirit Leveling Operations in the Trigonometrical and Revenue branches



of the Survey, see page 38 [of Vol. VII]. The sections into which the Series has thus been divided exhibit the following errors:—in the southern section ending at xviii, the maximum discordance was found to be + 7 feet; in the next, ending at the side xxviii–xxix, it was – 14 feet; and in the last section, it was + 4 feet. The errors were dispersed in the manner indicated at pages 38 and 39 of Part I of Volume VII.

*Secondary Triangulation.*

It will be seen on reference to the chart of this Series that little secondary triangulation was done in connection with the principal operations, excepting what was accomplished from the hill stations at the southern end of the Series. More could not have been done in the plains excepting by carrying chains of minor triangles for which neither the requisite agency nor instrumental equipment were at the time forthcoming. The positions of Sháhjahánpur and other secondary points, near the northern end of the Series, were fixed in the year 1849-50 by Mr. J. O. N. James, in connection with the operations of the North-East Longitudinal Series; it has been found convenient to exhibit the results with those of this Series; they will therefore be found in the Synoptical Volume for this Series.

*Compiled, with Addenda by the Surveyor General, by*

DEHRA DÚN :  
November 1881. }

C. WOOD.

*Surveyor 2nd Grade.*



## AMUA MERIDIONAL SERIES.

## ALPHABETICAL LIST OF STATIONS.

|                                      |                                      |
|--------------------------------------|--------------------------------------|
| Amúa . . . . . XVII.                 | Kartár . . . . . VII.                |
| (of Calcutta Longitudinal Series).   |                                      |
| Asu . . . . . XXIV.                  | Kokra . . . . . XXIII.               |
|                                      | (of North-East Longitudinal Series). |
| Bakseria . . . . . XXII.             | Lakanpúra . . . . . XIX.             |
|                                      | (of Calcutta Longitudinal Series).   |
| Baraoli . . . . . XXV.               | Maihar . . . . . I.                  |
| Bulandpúr . . . . . XXXI.            | Marfa . . . . . VIII.                |
| Dágri . . . . . V.                   | Máwa . . . . . XVI.                  |
| Dahlelnagar . . . . . XXV.           | Músápúr . . . . . XII.               |
| (of North-East Longitudinal Series). |                                      |
| Daráwal . . . . . XXVIII.            | Namána . . . . . XIX.                |
| Dewarsán . . . . . XVII.             | Nimkár . . . . . XXVI.               |
| Dharkána . . . . . IV.               | Paprendi . . . . . XI.               |
| Etora . . . . . XXIII.               | Parser . . . . . XXX.                |
| Fatenagar . . . . . XXVII.           | Patra . . . . . II.                  |
| Jafrábád . . . . . XIV.              | Pavia . . . . . X.                   |
| Jájmáo . . . . . XVIII.              | Potenda . . . . . III.               |
| Jalhotr . . . . . XXI.               | Ráo . . . . . XX.                    |
| Jarúra . . . . . XXXII.              | Sárang . . . . . VI.                 |
| Jehánábád . . . . . XV.              | Seonda . . . . . IX.                 |
| Kánákhera . . . . . XIII.            | Sirwaia . . . . . XXIX.              |

## AMUA MERIDIONAL SERIES.

## NUMERICAL LIST OF STATIONS.

|      |   |   |   |   |                                    |        |   |   |   |   |                                      |
|------|---|---|---|---|------------------------------------|--------|---|---|---|---|--------------------------------------|
| XVII | . | . | . | . | Amúa.                              | XVII   | . | . | . | . | Dewarsán.                            |
|      | . | . | . | . | (of Calcutta Longitudinal Series). |        | . | . | . | . |                                      |
| XIX  | . | . | . | . | Lakanpúra.                         | XVIII  | . | . | . | . | Jájmáo.                              |
|      | . | . | . | . | (of Calcutta Longitudinal Series). |        | . | . | . | . |                                      |
| I    | . | . | . | . | Maihar.                            | XIX    | . | . | . | . | Namána.                              |
| II   | . | . | . | . | Patra.                             | XX     | . | . | . | . | Ráo.                                 |
| III  | . | . | . | . | Potenda.                           | XXI    | . | . | . | . | Jalhotr.                             |
| IV   | . | . | . | . | Dharkána.                          | XXII   | . | . | . | . | Bakseria.                            |
| V    | . | . | . | . | Dágri.                             | XXIII  | . | . | . | . | Etora.                               |
| VI   | . | . | . | . | Sárang.                            | XXIV   | . | . | . | . | Asu.                                 |
| VII  | . | . | . | . | Kartár.                            | XXV    | . | . | . | . | Baraoli.                             |
| VIII | . | . | . | . | Marfa.                             | XXVI   | . | . | . | . | Nimkár.                              |
| IX   | . | . | . | . | Seonda.                            | XXVII  | . | . | . | . | Fatenagar.                           |
| X    | . | . | . | . | Pavia.                             | XXVIII | . | . | . | . | Daráwal.                             |
| XI   | . | . | . | . | Paprendi.                          | XXIX   | . | . | . | . | Sirwaia.                             |
| XII  | . | . | . | . | Músápúr.                           | XXX    | . | . | . | . | Parser.                              |
| XIII | . | . | . | . | Kánákhera.                         | XXXI   | . | . | . | . | Bulandpúr.                           |
| XIV  | . | . | . | . | Jafrábád.                          | XXXII  | . | . | . | . | Jarúra.                              |
| XV   | . | . | . | . | Jehánábád.                         | XXIII  | . | . | . | . | Kokra.                               |
| XVI  | . | . | . | . | Máwa.                              |        | . | . | . | . | (of North-East Longitudinal Series). |
|      |   |   |   |   |                                    | XXV    | . | . | . | . | Dahlelnagar.                         |
|      |   |   |   |   |                                    |        | . | . | . | . | (of North-East Longitudinal Series). |

## AMUA MERIDIONAL SERIES.

## DESCRIPTION OF STATIONS.



XVII.—(*Of Calcutta Longitudinal Series*). Amúa Hill Station, lat.  $24^{\circ} 0'$ , long.  $80^{\circ} 32'$ , is situated in the Maihar district, and stands on the southernmost extremity of the Kaimúr range, immediately to the E. of the village of Amúa. The encamping ground of Siwaganj, on the high road from Mirzapore to Jubbulpore, is distant about 3 miles to the N.

The station is marked by the centre of a circle engraved on a stone which is fixed on the surface of a platform, and placed perpendicularly over a similar stone at the base. The same point was used on the original as well as revised triangulation of the Calcutta Longitudinal Series.

XIX.—(*Of Calcutta Longitudinal Series*). Lakanpúra Hill Station, lat.  $24^{\circ} 3'$ , long.  $80^{\circ} 50'$ , is situated in the Maihar district, and stands on a peak of a small range of hills, at a distance of about  $1\frac{1}{2}$  miles to the N. of the small village of Lakna or Lakanpúra.

The station is marked by the centre of a circle engraved on a stone which is fixed on the surface of a platform, 2 feet  $4\frac{1}{2}$  inches perpendicularly over the mark which was used on the original triangulation of the Calcutta Longitudinal Series. It was found in good preservation when visited in April, 1865, in the course of the revision of the Calcutta Longitudinal Series.

I. Maihar Hill Station, lat.  $24^{\circ} 17'$ , long.  $80^{\circ} 46'$ , is situated in the Maihar district, and stands on the eastern extremity of the Bírápáhár, at a distance of about  $1\frac{1}{2}$  miles to the N.W. of the town of Maihar.

The station is marked by the centre of a circle engraved on a stone which is fixed in the middle of a platform about 2 feet high.

II. Patra Hill Station, lat.  $24^{\circ} 17'$ , long.  $81^{\circ} 11'$ , is situated in the Rewah district, and stands on the Kaimúr range, about 2 miles E. of the small village of Patra, and 10 miles S.E. of Amarpatan.

The station is marked by the centre of a circle engraved on a stone which is fixed in the middle of a platform, 2 feet perpendicularly above a similar mark engraved on the rock *in situ*.

III. Potenda Platform Station, lat.  $24^{\circ} 37'$ , long.  $81^{\circ} 0'$ , is situated in the Rewah district, and stands on an open plain, about  $\frac{1}{4}$  of a mile from the village of Potenda, and 6 miles E. of Mádhogarh.

The station is marked by the centre of a circle engraved on a stone which is fixed in the middle of a platform, 2 feet perpendicularly above a similar mark engraved on the rock *in situ*.

IV. Dharkána Hill Station, lat.  $24^{\circ} 28'$ , long.  $80^{\circ} 36'$ , is situated in the Nagode district, and stands on a detached hill of that name, about 3 miles S. of the small village of Chúnba, and 8 miles from the station of Nagode.

The station is marked by the centre of a circle engraved on a stone which is fixed in the middle of a platform,  $1\frac{1}{2}$  feet perpendicularly above a similar mark engraved on the rock *in situ*.

V. Dágri Hill Station, lat.  $24^{\circ} 51'$ , long.  $80^{\circ} 44'$ , is situated in the Nagode district, and stands on the south face of the Bindráchal range, distant about 8 miles to the N. of Koti, and immediately above the small village of Dágri.

The station is marked by the centre of a circle engraved on a stone which is fixed in the middle of a platform, about  $6\frac{1}{2}$  feet perpendicularly above a similar stone well imbedded in the ground.

VI. Sárang Hill Station, lat.  $24^{\circ} 46'$ , long.  $80^{\circ} 24'$ , is situated in the Panna district, and stands on a peak of that name in the Bindráchal range, distant about 3 miles S.W. of Ethwán, and 11 miles E. of Panna.

The station is denoted by the centre of a circle engraved on a stone which is fixed in the middle of a platform, about 3 feet perpendicularly above a similar stone flush with the natural surface of the ground.

VII. Kartár Hill Station, lat.  $25^{\circ} 2'$ , long.  $80^{\circ} 23'$ , is situated in the Banda district, and stands on a three-peaked isolated hill, close to the high road from Banda to Ságár.

The station is denoted by a dot engraved in the centre of a hole  $1\frac{1}{2}$  inches deep cut in the middle of a large boulder about 9 feet square.

VIII. Marfa Hill Station, lat.  $25^{\circ} 7'$ , long.  $80^{\circ} 44'$ , is situated in pargana Badaosa of the Banda district, and stands on an isolated hill of that name, on the north face of the Bindráchal range, at a distance of about 10 miles to the W. of Chitarkoti, a place of Hindoo pilgrimage. The hill was formerly fortified, and pretty considerably inhabited, judging from the several large tanks and ruins of buildings which are to be seen.

The station is on the ruins of an old building, and is denoted by the centre of a circle engraved on a stone which is fixed in the middle of a platform, about 5 feet perpendicularly above a similar mark at the level of the ground.

IX. Seonda Hill Station, lat.  $25^{\circ} 18'$ , long.  $80^{\circ} 24'$ , is situated in pargana Seonda of the Banda district, and stands on the eastern extremity of an isolated wedge-shaped hill immediately above the village of that name.

The station is denoted by the centre of a circle engraved on a long stone sunk to within 3 inches of the surface of a slightly elevated platform.

X. Pavia Hill Station, lat.  $25^{\circ} 27'$ , long.  $80^{\circ} 47'$ , is situated in pargana Seonda of the

Banda district, and stands on a low hill immediately S. of the village of that name. A platform in front of a small temple was used for the station.

The station is denoted by the centre of a circle engraved on a stone which was fixed in the middle of the platform and about  $6\frac{1}{2}$  feet perpendicularly above a similar stone imbedded below. The station subsequently required an additional elevation, and an earthen platform 11 feet in height was erected.

XI. Paprendi Tower Station, lat.  $25^{\circ} 38'$ , long.  $80^{\circ} 27'$ , is situated in pargana Pailáni of the Banda district, and stands on the centre tower on the east face of the mud fort of Paprendi.

The tower was first repaired, and heightened about 10 feet. This station is full 50 feet above the level of the surrounding country.

XII. Músápúr Tower Station, lat.  $25^{\circ} 47'$ , long.  $80^{\circ} 41'$ , is situated in pargana Gházípur of the Fatepúr district, and stands on a mound, elevated about 20 feet above the level of the surrounding country, and lying to the south of the small village of Músápúr.

An earthen platform 23 feet high has been constructed at this station.

XIII. Kánákhera Tower Station, lat.  $25^{\circ} 51'$ , long.  $80^{\circ} 28'$ , is situated in pargana Pailáni of the Banda district, and stands on a solid building in the S.E. corner of a fort attached to the village of Kánákhera.

The building was repaired, and heightened about 12 feet, giving it an elevation of full 40 feet above the level of the surrounding country.

XIV. Jafrábád Tower Station, lat.  $26^{\circ} 1'$ , long.  $80^{\circ} 38'$ , is situated in pargana Bindki and district Fatepúr, and stands on the N.E. tower of the mud fort adjoining the village of Jafrábád.

The tower was repaired, and heightened 17 feet, and the station is full 40 feet above the level of the surrounding country.

XV. Jehánábád Tower Station, lat.  $26^{\circ} 6'$ , long.  $80^{\circ} 24'$ , is situated in pargana Kora and district Fatepúr, and stands on the eastern of two small buildings raised about 9 feet above the roof of a house within a garden, at the S.E. extremity of the town of Jehánábád.

The station is full 40 feet above the level of the surrounding country.

XVI. Máwa Tower Station, lat.  $26^{\circ} 16'$ , long.  $80^{\circ} 34'$ , is situated in pargana Sarh Salempúr of the Cawnpore district, and stands on a mound, about 20 feet in height, situated to the N. of the village of Máwa.

An earthen platform 24 feet high has been constructed at this station.

XVII. Dewarsán Tower Station, lat.  $26^{\circ} 16'$ , long.  $80^{\circ} 21'$ , is situated in pargana Sarh Salempúr of the Cawnpore district, and stands on the N.W. tower of the inner line of the mud fort attached to the village of Dewarsán.

The tower has an elevation of upwards of 25 feet above the surrounding country, and the station is raised an additional 7 feet.

XVIII. Jájmaó Tower Station, lat.  $26^{\circ} 26'$ , long.  $80^{\circ} 27'$ , is situated in pargana Jájmaó

of the Cawnpore district, and stands on the eastern extremity of the high ground overlooking the Ganges, where formerly stood the fort attached to the village of Jajmáo.

The station is on an earthen platform raised about 8 feet in height.

XIX. Namána Tower Station, lat.  $26^{\circ} 28'$ , long.  $80^{\circ} 39'$ , is situated in the Harha district, and stands on a mound, 25 feet high, distant about  $\frac{1}{2}$  of a mile to the S. of the village of Namána.

The station is on a earthen platform 18 feet in height.

XX. Ráo Tower Station, lat.  $26^{\circ} 39'$ , long.  $80^{\circ} 30'$ , is situated in the Rasúlábád district, and stands on a mound, 25 feet high, distant  $\frac{1}{2}$  of a mile N.W. of the village of Ráo.

The station is on an earthen platform  $16\frac{1}{2}$  feet in height.

XXI. Jalhotr Tower Station, lat.  $26^{\circ} 42'$ , long.  $80^{\circ} 41'$ , is situated in the Rasúlábád district, and stands on the S.W. tower of the fort attached to the village of Jalhotr.

The tower is about 20 feet high, and an additional elevation of 15 feet was obtained by the erection of an earthen platform.

XXII. Bakseria Tower Station, lat.  $26^{\circ} 51'$ , long.  $80^{\circ} 32'$ , is situated in the Lassípúr district, and stands on the ruins of an old fort  $\frac{1}{2}$  of a mile S. of the small village of Bakseria.

An earthen platform 15 feet in height has been erected, which gives an elevation of about 40 feet above the surrounding country.

XXIII. Etorá Tower Station, lat.  $26^{\circ} 54'$ , long.  $80^{\circ} 42'$ , is situated in the Sandaila district, and stands on a mound, about 15 feet in height, distant  $\frac{1}{2}$  of a mile W. of the village of Etorá.

An earthen platform 18 feet high has been constructed.

XXIV. Asu Tower Station, lat.  $27^{\circ} 5'$ , long.  $80^{\circ} 31'$ , is situated in the Sandaila district, and stands on a mound, 25 feet in height, close to the village of Asu, and distant 2 miles N. of the town of Sandaila.

A platform 30 feet high has been constructed.

XXV. Baraoli Tower Station, lat.  $27^{\circ} 8'$ , long.  $80^{\circ} 43'$ , is situated in the Sandaila district, and stands on a mound, 20 feet in height, adjoining the village of Baraoli.

A platform of sun-dried bricks and mud cement 30 feet high has been erected.

XXVI. Nimkár Tower Station, lat.  $27^{\circ} 21'$ , long.  $80^{\circ} 32'$ , is situated in the Khairábád district, and stands on a mound, 15 feet high, distant  $\frac{1}{2}$  of a mile N.W. of the town of Nimkár, and  $\frac{1}{2}$  a mile N. of the Gúmíti river.

A platform of paka bricks and mud cement 30 feet high has been erected.

XXVII. Fatenagar Tower Station, lat.  $27^{\circ} 24'$ , long.  $80^{\circ} 43'$ , is situated in the Khairábád



district, and stands on an open plain  $2\frac{1}{2}$  miles S.E. of the large town of Macherhata, and  $\frac{1}{4}$  of a mile S.E. of the village of Bulandpúr.

A platform of sun-dried bricks and mud cement 35 feet high has been erected.

XXVIII. Daráwal Tower Station, lat.  $27^{\circ} 34'$ , long.  $80^{\circ} 31'$ , is situated in the Khairábád district, and stands on a mound, about 20 feet high, distant  $\frac{1}{2}$  of a mile N.E. of the village of Daráwal.

A tower of sun-dried bricks and mud cement 30 feet high has been erected.

XXIX. Sirwaia Tower Station, lat.  $27^{\circ} 38'$ , long.  $80^{\circ} 41'$ , is situated in the Khairábád district, and stands on the highest point of a mound on which, to the N.E. of the station, extends the village of Sirwaia.

A tower of sun-dried bricks and mud cement 30 feet high has been erected.

XXX. Parser Tower Station, lat.  $27^{\circ} 46'$ , long.  $80^{\circ} 32'$ , is situated in the Mahamdi district, and stands on a low mound, close to a large tank, distant about  $\frac{1}{2}$  a mile to the S.W. of the village of Parser.

A tower of sun-dried bricks and mud cement 24 feet high has been erected here.

XXXI. Bulandpúr Tower Station, lat.  $27^{\circ} 51'$ , long.  $80^{\circ} 43'$ , is situated in the Khairábád district, and stands within a small dilapidated mud fort, lying to the S. of the village of Bulandpúr.

A tower of sun-dried bricks and mud cement 24 feet high has been erected here.

XXXII. Jarúra Tower Station, lat.  $28^{\circ} 0'$ , long.  $80^{\circ} 31'$ , is situated in the Mahamdi district, and stands within a small dilapidated mud fort, to the west of, and hard by, the village of Jarúra.

A tower of sun-dried bricks and mud cement 28 feet high has been erected here.

XXIII.—(*Of the North-East Longitudinal Series*). Kokra Tower Station, lat.  $28^{\circ} 12'$ , long.  $80^{\circ} 31'$ , is situated in tehsíl Haidarábád of the Mahamdi district, and stands on flat ground on the verge of an extensive jungle. The village of Kokra is distant about  $1\frac{1}{2}$  miles to the S.W.

The station was constructed in 1833 for the triangulation of the Amúa Meridional Series, as a tower of sun-dried bricks and mud cement, 25 feet in height, with two mark-stones, one 2 feet below the level of the ground, the other at the surface of the tower. The upper mark was found wanting, and the tower in a dilapidated condition when the station was visited in 1843, in the course of the triangulation of the Pilibhít Terai Series. The old structure was then dismantled to the level of the lower mark, and a new tower 26 feet high constructed, with an isolated central paka pillar which contained mark-stones at distances of 2, 6, 12, 18, 24, 27, and 28 feet, respectively, above the lowest mark-stone. When the station was subsequently visited in 1850, in the course of the North-East Longitudinal Series, the upper portion of the pillar and tower were found to have been destroyed. The structure was again dismantled to within 10 feet of the surface of the ground, and a mark-stone having been found there, it was used as a centre over which a new pillar, with an earthen tower around it, was constructed to the height of 26 feet above the level of the ground, which carried a mark-stone at its surface placed in the normal of the lower mark.

XXV.—(*Of the North-East Longitudinal Series*). Dahlelnagar Tower Station, lat.  $28^{\circ} 4'$ , long.  $80^{\circ} 41'$ , is situated in tehsil Aliganj of the Mahamdi district, and occupies the highest part of the mound on which the village of Dahlelnagar stands.

A tower of sun-dried bricks and mud cement, 28 feet high, was erected here. It was found in good preservation when the station was visited in 1850, in the course of the triangulation of the North-East Longitudinal Series.

---

## AMUA MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the preceding descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives additional information as to position, construction, and present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

| No. of Station | Local name   | District                     | Pargana, &c.                     | Village in which the Station lies | Villages surrounding the Station                               | Remarks on the Construction and Condition of the Station                                              |
|----------------|--------------|------------------------------|----------------------------------|-----------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| XVII           | Amua         | Baghelkhand Agency           | Maihar State                     | Amua                              | ... ..                                                         | ... ..                                                                                                |
| XIX            | Lakhanpura   | Jubbulpore                   | Thá. Bijerághogarh, Tah. Murwára | Lakhanpura                        | ... ..                                                         | ... ..                                                                                                |
| I              | Maihar       | Baghelkhand Agency           | Maihar State                     | Maihar                            | ... ..                                                         | ... ..                                                                                                |
| II             | Patra        | „                            | Tál. Amarpátan, Rewah State      | ...                               | ... ..                                                         | ... ..                                                                                                |
| III            | Potenda      | „                            | Tál. Mádhogarh, Rewah State      | Potenda                           | ... ..                                                         | Reported in 1874. "The stones of this station thrown away. A new platform was made on the same spot." |
| IV             | Dharkána     | „                            | Nagode State                     | Chunaha                           | ... ..                                                         | ... ..                                                                                                |
| V              | Dágri        | „                            | Kothi State                      | Dágri                             | ... ..                                                         | ... ..                                                                                                |
| VI             | Sárang Pahár | Bundelkhand Political Agency | P. Panna                         | Ahargawa                          | ... ..                                                         | ... ..                                                                                                |
| VII            | Khairar      | Bánda                        | P. Bánda                         | Khairar                           | Kartal N. N. E. $\frac{1}{2}$ miles<br>Khora E. $5\frac{1}{2}$ | ... ..                                                                                                |
| VIII           | Marpha       | „                            | P. Badausa                       | Kúlhuán                           | ... ..                                                         | Reported in 1867. "The platform fell down last year."                                                 |

NOTE.—Stations XVII and XIX appertain to the Calcutta Longitudinal Series. P. stands for pargana, Tah. for tahsíl, Thá. for thána, and Tál. for táluks.

| No. of Station | Local name  | District | Pargana, &c.                        | Village in which the Station lies | Villages surrounding the Station                                                                           | Remarks on the Construction and Condition of the Station                                                  |
|----------------|-------------|----------|-------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| IX             | Sihonda     | Bánda    | P. Sihonda Girwan                   | Sihonda Girwan                    | miles<br>Sihonda Girwan S. $1\frac{3}{4}$<br>Bahádarpur W. S. W. 3<br>Gobindpur N. W. $2\frac{3}{4}$       | ... ..                                                                                                    |
| X              | Paúia       | ,,       | P. Augási                           | Paúia                             | ... ..                                                                                                     | ... ..                                                                                                    |
| XI             | Piprenda    | ,,       | P. Pailáni                          | Piprenda                          | ... ..                                                                                                     | Portions of the tower washed down by the rain in 1867, and the upper mark-stone reported as lost in 1870. |
| XII            | Músapur     | Fatehpur | Tah. Gházipur, P. Muttur            | Músapur <i>alias</i> Deogaon      | Muttur N. by E. $1\frac{1}{2}$<br>Simási E. S. E. $\frac{3}{4}$<br>Paigambarpur N. W. by N. $2\frac{1}{2}$ | The pillar tumbled down during the heavy rains of 1872-73 as reported in 1874.                            |
| XIII           | Kánákhera   | Bánda    | Tah. and P. Pailáni                 | Kánákhera                         | Narauli N. E. by E. $1\frac{1}{2}$<br>Rámpur W. by S. 3                                                    | Portions of the tower washed down by the rain in 1867, and the upper mark-stone reported as lost in 1870. |
| XIV            | Jáfrabad    | Fatehpur | Tah. Kaliánpur, P. Kutia Gunír      | Jáfrabad                          | Bindki N. N. W. 2<br>Kadjua N. W. by W. 5                                                                  | A part of the tower fallen down, and no mark-stone found, as reported in 1872.                            |
| XV             | Jahánabad   | ,,       | Tah. and P. Kora                    | Jahánabad                         | Kora N. $\frac{1}{2}$<br>Sháhjahánpur W. N. W. 1<br>Sakrabad E. by N. 2                                    | ... ..                                                                                                    |
| XVI            | Mahowa      | Cawnpore | P. Salámpur                         | Mahowa                            | Sirsol W. 1<br>Kharauli N. N. E. $1\frac{1}{4}$<br>Domanpur E. S. E. 2                                     | Reported in 1872. "The pillar requires to be rebuilt."                                                    |
| XVII           | Deor Sandáh | ,,       | Ditto.                              | Deor Sandáh                       | Sárh S. E. 3<br>Simra E. by N. $1\frac{1}{4}$<br>Sultánpur N. W. by W. 1                                   | Ditto.                                                                                                    |
| XVIII          | Jájmau      | ,,       | P. Jájmau                           | Jájmau                            | Cawnpore Railway Station W. by N. $4\frac{1}{2}$<br>Pokarpur W. $1\frac{1}{2}$                             | ... ..                                                                                                    |
| XIX            | Newarna     | Unao     | Tah. Unao, P. Harha, Thá. Achalganj | Newarna                           | Newarna Rám-sahai N. by E. $\frac{1}{2}$<br>Pareri Kalán E. 3<br>Korári Kalán W. by N. 4                   | Reported in 1873. "Only the foundation exists."                                                           |

NOTE.—P. stands for pargana, Tah. for tahsil and Thá. for thána.

| No. of Station | Local name   | District | Pargana, &c.                                                   | Village in which the Station lies | Villages surrounding the Station                                            | Remarks on the Construction and Condition of the Station                                                               |
|----------------|--------------|----------|----------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| XX             | Rau Kirna    | Unao     | Tah., P. and Thá. Unao                                         | Rau                               | Makhi N. E. 1½<br>Thána S. 2¼                                               | Reported in 1873. "Only the foundation exists."                                                                        |
| XXI            | ...          | ...      | ...                                                            | ...                               | ...                                                                         | Reported in 1870. "Demolished with the fort (on which it stood) after the Indian Mutiny, and there is no trace of it." |
| XXII           | Garhi Baksar | Unao     | Tah. Mohán, P. Asiwan, Thá. Achalganj, Tál. Tikar              | Chak Bíreshar                     | Haidarabad S. by E. 2½<br>Ajgain N. E. 3                                    | Reported in 1873. "There is nothing remaining of it except a few marks of its former existence."                       |
| XXIII          | Etorá        | Lucknow  | Tah., P. and Thá. Maliha- bad, Tál. Sai- lamau                 | Etorá                             | Bakhtiárnagar E. by S. 3½<br>Mirzaganj E. N. E. 3½<br>Bíárigaon W. S. W. 3¼ | Platform washed away by rain as reported in 1875.                                                                      |
| XXIV           | Asu Sarai    | Hardoi   | Tah., P. and Thá. Sandíla                                      | Asu Sarai                         | Sandíla E. by S. 2¼                                                         | Reported in 1874 as being 24 feet high.                                                                                |
| XXV            | Barauli      | "        | Tah. Sandíla, P. Bálamau, Thá. Kachhona                        | Barauli                           | Barwan N. E. 2½<br>Atrauli N. by W. 2¼                                      | Reported in 1874 as being 22 feet high.                                                                                |
| XXVI           | ...          | Sitapur  | Tah., P. and Thá. Misrikh, Tál. Aurang- abad                   | Nimkár                            | Aurangabad E. by S. 4<br>Beniganj S. W. by S. 4¼                            | ...                                                                                                                    |
| XXVII          | ...          | "        | Tah. Misrikh, P. Machhreh- ta, Tál. Baria- mau, Thá. Si- tapur | Bulandapur                        | Kurauna S. W. by W. 4                                                       | ...                                                                                                                    |
| XXVIII         | ...          | "        | Tah. Misrikh, Thá. Maholi, Tál. Dundá- wal                     | Dundáwal                          | Bihat E. by S. 1<br>Pisáwan W. N. W. 5½                                     | ...                                                                                                                    |
| XXIX           | ...          | "        | Tah., P. and Thá. Sitapur, Tál. Halna- pur                     | Sahrohi                           | Town of Sitapur S. E. by S. 4                                               | ...                                                                                                                    |
| XXX            | ...          | "        | Tah. Misrikh, P. and Thá. Maholi, Tál. Baragaon                | Parsera                           | Baragaon S. S. E. 2<br>Mitauli N. N. W. 3½                                  | ...                                                                                                                    |
| XXXI           | Bhulanpur    | Kheri    | Tah. and Thá. Lakhimpur, P. Basarah, Tál. Raja Oel             | ...                               | Basarah N. W. 1½<br>Oel E. by S. 5                                          | ...                                                                                                                    |

NOTE.—P. stands for pargana, Tah. for tahsil, Thá. for thána and Tál. for táluka.

## AMUA MERIDIONAL SERIES.

| No. of Station                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Local name | District | Pargana, &c.                                                         | Village in which the Station lies | Villages surrounding the Station                                           | Remarks on the Construction and Condition of the Station                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|----------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| XXXII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Jaraura    | Kheri    | Tah. Muhamdi, P. Haidarabad, Tál. Ilá-<br>hibaksh Khán,<br>Thá. Gola | ...                               | Alipur S. by W. $2\frac{1}{2}$ miles<br>Haidarabad<br>N. W. $4\frac{1}{2}$ | The station fallen down as reported in 1877.                                                                                                                                                                                                                                                    |
| XXIII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Kokra      | „        | Tah. Muhamdi,<br>P. Haidarabad                                       | ...                               | Gauri E. by S. $2\frac{1}{2}$<br>Hardua W. 2<br>Khamaria S. $1\frac{1}{2}$ | The station was constructed in 1833 for the Amua Meridional Series as a tower of sun-dried bricks and mud                                                                                                                                                                                       |
| <p>cement, 25 feet in height, with two mark-stones, one 2 feet below the level of the ground, the other at the surface of the tower. The upper mark-stone was found wanting, and the tower in a dilapidated condition when visited in 1843, in the course of the operations of the Pilibhít Tarái Series. The old structure was then dismantled to the level of the lower mark, and a new tower 26 feet high constructed, with an isolated central paka pillar which contained mark-stones at distances of 2, 6, 12, 18, 24, 27, and 28 feet, respectively, above the lowest mark-stone. When the station was subsequently visited in 1850, in the course of the North-East Longitudinal Series, the upper portion of the pillar and tower were found to have been destroyed. The structure was again dismantled to within 10 feet of the surface of the ground, and a mark-stone having been found there, it was used as a centre over which a new pillar, with an earthen tower around it, was constructed to the height of 26 feet above the level of the ground, which carried a mark-stone at its surface placed in the normal of the lower mark. Pillar partly fallen down as reported in 1871.</p> |            |          |                                                                      |                                   |                                                                            |                                                                                                                                                                                                                                                                                                 |
| XXV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ...        | Kheri    | Tah. Lakhimpur, P. Ali-ganj                                          | ...                               | Bhúrpur S. W. $1\frac{1}{2}$<br>Aliganj N. W. 4<br>Khánpur<br>E. N. E. 1   | The central pillar as constructed about the year 1838, was enclosed in a tower of sun-dried bricks and mud cement. It was found in good preservation when visited in 1850 in the course of the operations of the North-East Longitudinal Series. Pillar partly fallen down as reported in 1871. |

NOTE.—Stations XXIII and XXV appertain to the North-East Longitudinal Series. P. stands for pargana, Tah. for tahsíl, Thá. for thána, and Tál. for táluka.

August, 1882.

J. B. N. HENNESSEY,  
In charge of Computing Office.

## AMUA MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. TRIANGLES.

NOTE.—The preceding pages, 1—L. to 8—L., having been printed in 1869, the spelling of Indian proper names occurring in them is in accordance with the Departmental or old rules; these prevailed until 1874, when the Government or new rules for spelling were published. The transition now (1878) necessary from the old to the new rules is effected hereafter as follows. Names not already printed are rendered by only one method of spelling, *i.e.*, the new. Any name that has appeared in the preceding pages is given by both methods, *viz.*, in Roman type by the new rules and in Italics by the old; to avoid needless repetitions, this is done *only* in the *first* instance that a name of the kind occurs. It will be seen that the two methods of spelling differ but slightly.

| No. of Triangle | Station                             | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|-------------------------------------|------------------|-----------------------|-----------|----------|--------|
|                 |                                     |                  |                       | Log. feet | Feet     | Miles  |
| 1               | Amua ( <i>Amia</i> ), XVII          | 71               | 42 12 34'93           | 4'9453592 | 88177'8  | 16'700 |
|                 | Lakanpura ( <i>Lakanpura</i> ), XIX | 71               | 86 34 48'11           | 5'1173154 | 131013'3 | 24'813 |
|                 | Maihar, I                           | 71               | 51 12 36'96           | 5'0098779 | 102300'6 | 19'375 |
| 2               | Lakanpura, XIX                      | 94               | 67 44 53'04           | 5'1427169 | 138904'7 | 26'308 |
|                 | Maihar, I                           | 94               | 76 16 11'47           | 5'1637365 | 145793'0 | 27'612 |
|                 | Patra, II                           | 93               | 35 58 55'49           | 4'9453592 | 88177'8  | 16'700 |
| 3               | Maihar, I                           | 1'36             | 59 35 8'07            | 5'1479144 | 140577'1 | 26'624 |
|                 | Patra, II                           | 1'36             | 61 58 14'39           | 5'1580293 | 143889'6 | 27'252 |
|                 | Potenda, III                        | 1'36             | 58 26 37'54           | 5'1427169 | 138904'7 | 26'308 |
| 4               | Maihar, I                           | 96               | 72 14 24'75           | 5'1590216 | 144218'7 | 27'314 |
|                 | Potenda, III                        | 96               | 35 55 24'25           | 4'9486463 | 88847'7  | 16'827 |
|                 | Dharkana, IV                        | 96               | 71 50 11'00           | 5'1580293 | 143889'6 | 27'252 |
| 5               | Potenda, III                        | 1'25             | 67 18 35'20           | 5'1685977 | 147434'0 | 27'923 |
|                 | Dharkana, IV                        | 1'25             | 48 12 13'58           | 5'0760416 | 119135'6 | 22'564 |
|                 | Dagri, V                            | 1'25             | 64 29 11'22           | 5'1590216 | 144218'7 | 27'314 |

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Stations Amua, XVII, and Lakanpura, XIX, appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

## AMUA MERIDIONAL SERIES.

| No. of Triangle | Station                            | Spherical Excess | Corrected Plane Angle |    |       | Distance  |          |        |
|-----------------|------------------------------------|------------------|-----------------------|----|-------|-----------|----------|--------|
|                 |                                    |                  |                       |    |       | Log. feet | Feet     | Miles  |
| 6               | Dharkána, IV                       | 1'12             | 50                    | 0  | 18'10 | 5'0685557 | 117099'7 | 22'178 |
|                 | Dágri, V                           | 1'12             | 55                    | 17 | 42'25 | 5'0991918 | 125658'5 | 23'799 |
|                 | Sárang, VI                         | 1'12             | 74                    | 41 | 59'65 | 5'1685977 | 147434'0 | 27'923 |
| 7               | Dágri, V                           | .86              | 44                    | 9  | 41'85 | 4'9816614 | 95865'3  | 18'156 |
|                 | Sárang, VI                         | .87              | 77                    | 31 | 3'11  | 5'1282360 | 134349'5 | 25'445 |
|                 | Kartár, VII                        | .86              | 58                    | 19 | 15'04 | 5'0685557 | 117099'7 | 22'178 |
| 8               | Dágri, V                           | .91              | 63                    | 6  | 19'87 | 5'0971315 | 125063'8 | 23'686 |
|                 | Kartár, VII                        | .91              | 43                    | 32 | 50'56 | 4'9850344 | 96612'7  | 18'298 |
|                 | Marpha ( <i>Marfa</i> ), VIII      | .91              | 73                    | 20 | 49'57 | 5'1282360 | 134349'5 | 25'445 |
| 9               | Kartár, VII                        | .94              | 69                    | 48 | 26'37 | 5'1171546 | 130964'8 | 24'804 |
|                 | Marpha, VIII                       | .93              | 46                    | 31 | 24'34 | 5'0054338 | 101259'0 | 19'178 |
|                 | Sihonda ( <i>Seonda</i> ), IX      | .94              | 63                    | 40 | 9'29  | 5'0971315 | 125063'8 | 23'686 |
| 10              | Marpha, VIII                       | 1'15             | 64                    | 32 | 41'82 | 5'1331946 | 135892'2 | 25'737 |
|                 | Sihonda, IX                        | 1'15             | 54                    | 58 | 30'47 | 5'0907764 | 123247'0 | 23'342 |
|                 | Pavia, X                           | 1'15             | 60                    | 28 | 47'71 | 5'1171546 | 130964'8 | 24'804 |
| 11              | Sihonda, IX                        | 1'09             | 58                    | 51 | 54'81 | 5'1008475 | 126138'4 | 23'890 |
|                 | Pavia, X                           | 1'09             | 53                    | 53 | 37'23 | 5'0757683 | 119060'6 | 22'549 |
|                 | Paprendi, XI                       | 1'10             | 67                    | 14 | 27'96 | 5'1331946 | 135892'2 | 25'737 |
| 12              | Pavia, X                           | .84              | 44                    | 37 | 48'90 | 4'9732254 | 94021'1  | 17'807 |
|                 | Paprendi, XI                       | .85              | 64                    | 53 | 31'98 | 5'0834550 | 121186'7 | 22'952 |
|                 | Músapur ( <i>Múspúr</i> ), XII     | .85              | 70                    | 28 | 39'12 | 5'1008475 | 126138'4 | 23'890 |
| 13              | Paprendi, XI                       | .47              | 50                    | 18 | 40'12 | 4'8804914 | 75943'6  | 14'383 |
|                 | Músapur, XII                       | .48              | 57                    | 22 | 53'89 | 4'9197257 | 83123'9  | 15'743 |
|                 | Kánákhera, XIII                    | .48              | 72                    | 18 | 25'99 | 4'9732254 | 94021'1  | 17'807 |
| 14              | Músapur, XII                       | .44              | 57                    | 42 | 48'79 | 4'8990308 | 79255'8  | 15'011 |
|                 | Kánákhera, XIII                    | .44              | 68                    | 11 | 5'00  | 4'9397035 | 87036'9  | 16'484 |
|                 | Jáfrabad ( <i>Jáfrábád</i> ), XIV  | .44              | 54                    | 6  | 6'21  | 4'8804914 | 75943'6  | 14'383 |
| 15              | Kánákhera, XIII                    | .48              | 56                    | 50 | 23'65 | 4'9131469 | 81874'2  | 15'506 |
|                 | Jáfrabad, XIV                      | .48              | 69                    | 1  | 39'89 | 4'9605784 | 91322'6  | 17'296 |
|                 | Jahánabad ( <i>Jehánábád</i> ), XV | .48              | 54                    | 7  | 56'46 | 4'8990308 | 79255'8  | 15'011 |
| 16              | Jáfrabad, XIV                      | .49              | 52                    | 37 | 50'95 | 4'9006164 | 79545'6  | 15'065 |
|                 | Jahánabad, XV                      | .49              | 72                    | 29 | 0'74  | 4'9797708 | 95448'9  | 18'077 |
|                 | Máwa, XVI                          | .49              | 54                    | 53 | 8'31  | 4'9131469 | 81874'2  | 15'506 |
| 17              | Jahánabad, XV                      | .34              | 59                    | 0  | 28'68 | 4'8547637 | 71575'4  | 13'556 |
|                 | Máwa, XVI                          | .34              | 48                    | 41 | 7'49  | 4'7973573 | 62713'0  | 11'877 |
|                 | Dewarsán, XVII                     | .34              | 72                    | 18 | 23'83 | 4'9006164 | 79545'6  | 15'065 |
| 18              | Máwa, XVI                          | .34              | 59                    | 21 | 31'50 | 4'8451257 | 70004'4  | 13'258 |
|                 | Dewarsán, XVII                     | .34              | 59                    | 2  | 13'78 | 4'8436724 | 69770'6  | 13'214 |
|                 | Jájmau ( <i>Jájmao</i> ), XVIII    | .34              | 61                    | 36 | 14'72 | 4'8547637 | 71575'4  | 13'556 |
| 19              | Máwa, XVI                          | .34              | 51                    | 36 | 32'79 | 4'8134820 | 65085'2  | 12'327 |
|                 | Jájmau, XVIII                      | .34              | 71                    | 13 | 40'34 | 4'8955420 | 78621'6  | 14'890 |
|                 | Namána, XIX                        | .34              | 57                    | 9  | 46'87 | 4'8436724 | 69770'6  | 13'214 |
| 20              | Jájmau, XVIII                      | .38              | 67                    | 44 | 40'81 | 4'9091738 | 81128'6  | 15'365 |
|                 | Namána, XIX                        | .38              | 64                    | 18 | 42'75 | 4'8976001 | 78995'1  | 14'901 |
|                 | Rau ( <i>Ráo</i> ), XX             | .37              | 47                    | 56 | 36'44 | 4'8134820 | 65085'2  | 12'327 |



PRINCIPAL TRIANGULATION. TRIANGLES.

11—L.

| No. of Triangle | Station                                | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|----------------------------------------|------------------|-----------------------|-----------|----------|--------|
|                 |                                        |                  |                       | Log. feet | Feet     | Miles  |
| 21              | Namāna, XIX                            | "                | ° ' "                 |           |          |        |
|                 | Rau, XX                                | 37               | 44 33 21.17           | 4.7913808 | 61855.9  | 11.715 |
|                 | Jhalotar ( <i>Jalhotr</i> ), XXI       | 37               | 68 29 16.10           | 4.9139299 | 82021.9  | 15.534 |
| 22              | Rau, XX                                | 37               | 66 57 22.73           | 4.9091738 | 81128.6  | 15.365 |
|                 | Jhalotar, XXI                          | 33               | 63 41 23.19           | 4.8629283 | 72933.7  | 13.813 |
|                 | Bakseria, XXII                         | 33               | 66 49 25.52           | 4.8738795 | 74796.2  | 14.166 |
| 23              | Jhalotar, XXI                          | 33               | 49 29 11.29           | 4.7913808 | 61855.9  | 11.715 |
|                 | Bakseria, XXII                         | 32               | 46 7 20.44            | 4.7704535 | 58945.9  | 11.164 |
|                 | Etorā, XXIII                           | 32               | 70 46 5.65            | 4.8876870 | 77212.4  | 14.624 |
| 24              | Bakseria, XXII                         | 32               | 63 6 33.91            | 4.8629283 | 72933.7  | 13.813 |
|                 | Etorā, XXIII                           | 37               | 71 59 31.90           | 4.9343982 | 85980.2  | 16.284 |
|                 | Asu, XXIV                              | 37               | 67 18 56.98           | 4.9212456 | 83415.3  | 15.798 |
| 25              | Etorā, XXIII                           | 37               | 40 41 31.12           | 4.7704535 | 58945.9  | 11.164 |
|                 | Asu, XXIV                              | 42               | 46 56 50.78           | 4.8330122 | 68078.9  | 12.894 |
|                 | Barauli ( <i>Baraoli</i> ), XXV        | 42               | 65 42 10.51           | 4.9289772 | 84913.6  | 16.082 |
| 26              | Asu, XXIV                              | 43               | 67 20 58.71           | 4.9343982 | 85980.2  | 16.284 |
|                 | Barauli, XXV                           | 51               | 70 9 33.39            | 5.0001742 | 100040.1 | 18.947 |
|                 | Nimkār, XXVI                           | 51               | 70 2 23.85            | 4.9998468 | 99964.7  | 18.933 |
| 27              | Barauli, XXV                           | 50               | 39 48 2.76            | 4.8330122 | 68078.9  | 12.894 |
|                 | Nimkār, XXVI                           | 46               | 37 59 26.64           | 4.8040218 | 63682.8  | 12.061 |
|                 | Fatehnagar ( <i>Fatenagar</i> ), XXVII | 47               | 66 46 50.46           | 4.9780865 | 95079.4  | 18.007 |
| 28              | Nimkār, XXVI                           | 47               | 75 13 42.90           | 5.0001742 | 100040.1 | 18.947 |
|                 | Fatehnagar, XXVII                      | 37               | 75 18 17.78           | 4.9322553 | 85557.0  | 16.204 |
|                 | Darāwal, XXVIII                        | 37               | 58 38 30.72           | 4.8781217 | 75530.4  | 14.305 |
| 29              | Fatehnagar, XXVII                      | 37               | 46 3 11.50            | 4.8040218 | 63682.8  | 12.061 |
|                 | Darāwal, XXVIII                        | 36               | 39 34 3.64            | 4.7589892 | 57410.2  | 10.873 |
|                 | Sirwaia, XXIX                          | 36               | 68 45 26.31           | 4.9242982 | 84003.7  | 15.910 |
| 30              | Darāwal, XXVIII                        | 37               | 71 40 30.05           | 4.9322553 | 85557.0  | 16.204 |
|                 | Sirwaia, XXIX                          | 30               | 59 40 13.30           | 4.8391159 | 69042.4  | 13.076 |
|                 | Parser, XXX                            | 30               | 74 27 48.72           | 4.8868711 | 77067.5  | 14.596 |
| 31              | Sirwaia, XXIX                          | 30               | 45 51 57.98           | 4.7589892 | 57410.2  | 10.873 |
|                 | Parser, XXX                            | 33               | 47 55 31.62           | 4.7963020 | 62560.8  | 11.849 |
|                 | Bulandpur ( <i>Bulandpur</i> ), XXXI   | 34               | 77 4 19.35            | 4.9145877 | 82146.3  | 15.558 |
| 32              | Bulandpur, XXXI                        | 33               | 55 0 9.03             | 4.8391159 | 69042.4  | 13.076 |
|                 | Jarūra, XXXII                          | 37               | 68 2 30.29            | 4.9209844 | 83365.1  | 15.789 |
|                 | Jarūra, XXXII                          | 37               | 67 51 3.77            | 4.9203988 | 83252.8  | 15.768 |
| 33              | Dahlelnagar, XXV                       | 37               | 44 6 25.94            | 4.7963020 | 62560.8  | 11.849 |
|                 | Jarūra, XXXII                          | 38               | 44 55 35.21           | 4.7950568 | 62381.6  | 11.815 |
|                 | Kokra, XXIII                           | 38               | 64 23 0.19            | 4.9011956 | 79651.8  | 15.086 |
| 34              | Dahlelnagar, XXV                       | 39               | 70 41 24.50           | 4.9209844 | 83365.1  | 15.789 |
|                 | Kokra, XXIII                           | 33               | 65 10 33.05           | 4.8693168 | 74014.5  | 14.018 |
|                 |                                        | 33               | 64 55 16.82           | 4.8684193 | 73861.7  | 13.989 |
|                 |                                        | 33               | 49 54 10.13           | 4.7950568 | 62381.6  | 11.815 |

NOTE.—Stations Kokra, XXIII, and Dahlelnagar, XXV, appertain to the North-East Longitudinal Series.

October 1878.

J. B. N. HENNESSEY,

In charge of Computing Office.

# **AMUA MERIDIONAL SERIES.** **SECONDARY TRIANGULATION. TRIANGLES.**

## PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

| No. of Triangle | Station        | Corrected plane angle | Distance  |        |        | Theodolite used | No. of Triangle | Station         | Corrected plane angle | Distance  |        |        | Theodolite used |
|-----------------|----------------|-----------------------|-----------|--------|--------|-----------------|-----------------|-----------------|-----------------------|-----------|--------|--------|-----------------|
|                 |                |                       | Log. feet | Feet   | Miles  |                 |                 |                 |                       | Log. feet | Feet   | Miles  |                 |
| 35              | Lakanpura, XIX | 43 39 1               | 4'784372  | 60866  | 11'528 | Inch            | 40              | Maihar, I       | 69 51 40              | 4'767232  | 58510  | 11'081 | Inch            |
|                 | Maihar, I      | 46 7 19               | 4'803187  | 63561  | 12'038 | "               |                 | Tindota         | 7 44 3                | 3'923602  | 8387   | 1'588  | "               |
|                 | Tindota        | 90 13 40              | 4'945359  | 88178  | 16'700 | "               |                 | Sarda Fort      |                       | 4'784372  | 60866  | 11'528 | "               |
| 36              | Maihar, I      | 11 2 38               | 4'501547  | 31736  | 6'011  | "               | 41              | Maihar, I       | 26 0 19               | 4'968798  | 93067  | 17'626 | "               |
|                 | Tindota        | 10 30 40              | 4'480327  | 30222  | 5'724  | "               |                 | Pátol           | 2 39 13               | 3'992433  | 9827   | 1'861  | "               |
|                 | Sunwari Fort   |                       | 4'784372  | 60866  | 11'528 | "               |                 | Maihar Palace   |                       | 5'007748  | 101800 | 19'280 | "               |
| 37              | Lakanpura, XIX | 69 13 28              | 5'007748  | 101800 | 19'280 | "               | 42              | Tindota         | 129 55 28             | 4'968798  | 93067  | 17'626 | "               |
|                 | Maihar, I      | 49 27 23              | 5'035398  | 108492 | 20'548 | "               |                 | Pátol           | 24 52 41              | 4'708025  | 51053  | 9'669  | "               |
|                 | Pátol          |                       | 4'945359  | 88178  | 16'700 | "               |                 | Maihar Palace   |                       | 4'713208  | 51666  | 9'785  | "               |
| 38              | Tindota        | 71 56 0               | 4'693807  | 49409  | 9'358  | "               | 43              | Amua, XVII      | 18 12 48              | 4'653605  | 45041  | 8'530  | "               |
|                 | Pátol          | 24 16 41              | 4'329782  | 21369  | 4'047  | "               |                 | Maihar, I       | 47 10 32              | 5'024042  | 105692 | 20'017 | "               |
|                 | Jura Fort      |                       | 4'713208  | 51666  | 9'785  | "               |                 | Jarra Hill Mark |                       | 5'117315  | 131013 | 24'813 | "               |
| 39              | Lakanpura, XIX | 46 3 7                | 4'767232  | 58510  | 11'081 | "               | 44              | Maihar, I       | 53 31 3               | 4'856488  | 71860  | 13'610 | "               |
|                 | Tindota        | 82 29 37              | 4'906180  | 80571  | 15'260 | "               |                 | Dharkána, IV    | 30 15 44              | 4'653605  | 45041  | 8'530  | "               |
|                 | Sarda Fort     |                       | 4'803188  | 63561  | 12'038 | "               |                 | Jarra Hill Mark |                       | 4'948646  | 88848  | 16'827 | "               |

NOTES.—1. Names followed by Roman numerals are those of Principal Stations. Stations Amua, XVII, and Lakanpura, XIX, appertain to the Calcutta Longitudinal Series of the S. E. Quadrilateral.  
 2. The values of the side are given in the same line with the opposite angle. \* Base deduced by two sides and included angle.

SECONDARY TRIANGULATION. TRIANGLES.

13

J. B. N. HENNESSEY,  
In charge of Computing Office.

| No. of Triangle | Station                                         | Corrected plane angle | Distance                         |                            |                            | Theodolite used | No. of Triangle | Station                                            | Corrected plane angle | Distance                         |                           |                            | Theodolite used |
|-----------------|-------------------------------------------------|-----------------------|----------------------------------|----------------------------|----------------------------|-----------------|-----------------|----------------------------------------------------|-----------------------|----------------------------------|---------------------------|----------------------------|-----------------|
|                 |                                                 |                       | Log. feet                        | Feet                       | Miles                      |                 |                 |                                                    |                       |                                  |                           |                            |                 |
| 45              | Amua, XVII<br>Sarang, VI<br>Dokhan Hill Mark    | 22 49 30<br>16 6 45   | 5'238636<br>5'093197<br>5'448183 | 173235<br>123936<br>280661 | 32'810<br>23'473<br>53'156 | Inch<br>18<br>" | 56              | Dharkana, IV<br>Dagri, V<br>Dho Hill Mark          | 40 53 7<br>53 33 32   | 4'985846<br>5'075414<br>5'168598 | 96793<br>118964<br>147434 | 18'332<br>22'531<br>27'923 | Inch<br>18<br>" |
| 46              | Tindota<br>Patol<br>Amarpatan Temple            | 34 56 47<br>70 21 23  | 4'486897<br>4'702846<br>4'713208 | 30683<br>50448<br>51666    | 5'811<br>9'555<br>9'785    | "<br>"<br>"     | 57              | Dharkana, IV<br>Sarang, VI<br>Dho Hill Mark        | 9 7 12<br>66 30 0     | 4'313053<br>5'075414<br>5'099192 | 20561<br>118964<br>125658 | 3'894<br>22'531<br>23'799  | "<br>"<br>"     |
| 47              | Amua, XVII<br>Sarang, VI<br>Murwari Hill Mark   | 19 30 15<br>17 16 35  | 5'194520<br>5'143665<br>5'448183 | 156502<br>139208<br>280661 | 29'641<br>26'365<br>53'156 | "<br>"<br>"     | 58              | Dagri, V<br>Sarang, VI<br>Jali Hill Mark           | 63 17 29<br>11 17 52  | 5'035458<br>4'376511<br>5'068556 | 108507<br>23796<br>117100 | 20'551<br>4'507<br>22'178  | "<br>"<br>"     |
| 48              | Amua, XVII<br>Patra, II<br>Kusla Hill Mark      | 28 57 12<br>36 25 10  | 5'110322<br>5'198951<br>5'383972 | 128921<br>158107<br>242087 | 24'417<br>29'944<br>45'850 | "<br>"<br>"     | 59              | Kartar, VII<br>Sihonda, IX<br>Umri Hill Mark       | 34 2 9<br>12 28 28    | 4'892762<br>4'479259<br>5'005434 | 78120<br>30148<br>101259  | 14'795<br>5'710<br>19'178  | "<br>"<br>"     |
| 49              | Tindota<br>Patol<br>Unchehra Temple             | 98 22 24<br>50 11 46  | 4'991329<br>4'881480<br>4'713208 | 98023<br>76117<br>51666    | 18'565<br>14'416<br>9'785  | "<br>"<br>"     | 60              | Sarang, VI<br>Kartar, VII<br>Umri Hill Mark        | 6 4 7<br>154 17 16    | 4'479259<br>5'092445<br>4'981661 | 30148<br>123722<br>95865  | 5'710<br>23'432<br>18'156  | "<br>"<br>"     |
| 50              | Tindota<br>Patol<br>Unchehra Palace             | 98 23 41<br>50 12 17  | 4'991678<br>4'881997<br>4'713208 | 98102<br>76192<br>51666    | 18'580<br>14'430<br>9'785  | "<br>"<br>"     | 61              | Kartar, VII<br>Marpha, VIII<br>Chandor Hill Temple | 8 24 56<br>106 20 7   | 4'304378<br>5'121085<br>5'097132 | 20155<br>132155<br>125064 | 3'817<br>25'029<br>23'686  | "<br>"<br>"     |
| 51              | Maihar, I<br>Tindota<br>Shankargarh Fort        | 104 34 0<br>36 46 17  | 4'974494<br>4'765838<br>4'784372 | 94296<br>58323<br>60866    | 17'859<br>11'046<br>11'528 | "<br>"<br>"     | 62              | Sihonda, IX<br>Pavia, X<br>Banda Mark              | 76 11 16<br>26 39 33  | 5'131461<br>4'796143<br>5'133195 | 133351<br>62338<br>135892 | 25'635<br>11'844<br>25'737 | "<br>"<br>"     |
| 52              | Maihar, I<br>Patra, II<br>Lalpahar Hill Mark    | 53 50 25<br>30 24 8   | 5'051989<br>4'849122<br>5'142717 | 112717<br>70652<br>138905  | 21'348<br>13'381<br>26'308 | "<br>"<br>"     | 63              | Pavia, X<br>Papendi, XI<br>Banda Mark              | 27 14 5<br>84 39 26   | 4'793873<br>5'131461<br>5'100848 | 62212<br>135351<br>126138 | 11'783<br>25'635<br>23'890 | "<br>"<br>"     |
| 53              | Patra, II<br>Potenda, III<br>Lalpahar Hill Mark | 31 34 8<br>52 57 15   | 4'868838<br>5'051989<br>5'147914 | 73933<br>112717<br>140577  | 14'002<br>21'348<br>26'624 | "<br>"<br>"     | 64              | Jajman, XVIII<br>Rau, XX<br>Cawnpore Church        | 61 33 43<br>17 6 11   | 4'850308<br>4'374637<br>4'897600 | 70845<br>23694<br>78995   | 13'418<br>4'487<br>14'961  | "<br>"<br>"     |
| 54              | Dharkana, IV<br>Sarang, VI<br>Dureha Hill Mark  | 73 13 54<br>12 46 26  | 5'081377<br>4'444845<br>5'099192 | 120608<br>27851<br>125658  | 22'842<br>5'275<br>23'799  | "<br>"<br>"     | 65              | Jajman, XVIII<br>Cawnpore Church<br>Savada         | 32 14 40<br>106 48 30 | 4'120760<br>4'210082<br>4'374637 | 13206<br>16221<br>23094   | 2'501<br>3'072<br>4'487    | "<br>"<br>†     |
| 55              | Dharkana, IV<br>Sarang, VI<br>Pauna, Hill Mark  | 21 8 26<br>103 41 23  | 4'742024<br>5'172413<br>5'099192 | 55211<br>148735<br>125658  | 10'457<br>28'170<br>23'799 | "<br>"<br>"     |                 |                                                    |                       |                                  |                           |                            |                 |

NOTE.—Station Amua, XVII, appertains to the Calcutta Longitudinal Series of the South-East Quadrilateral.  
\* Base deduced by two sides and included angle.  
† Instrument not known.

November 1878.

# AMUA MERIDIONAL SERIES.

## AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL, PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

The following table contains, in the first column, the name of each Principal, Principal-Auxiliary, or Secondary Station, at which azimuths of surrounding Points have been measured; immediately followed by those azimuths. The second column contains the number of the triangle which gives the distance between the Station and the Point.

| Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance |
|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|
| AMUA, XVII*                                         | 0 1 "                           | BARAULI, XXV                                        | 0 1 "                           | DAHLELNAGAR, XXV†                                   | 0 1 "                           |
| Dokhán Hill Mark                                    | 148 8 54                        | Etorá, XXIII                                        | 3 45 27 32                      | Jarúrá, XXXII                                       | 65 5 47 39                      |
| Murwári "                                           | 151 28 9                        | Asu, XXIV                                           | 71 6 26 46                      | Kokra, XXXIII†                                      | 130 1 4 54                      |
| Jarra "                                             | 199 38 57                       | Nimkár, XXVI                                        | 141 8 50 82                     | Bulandpur, XXXI                                     | 354 24 22 40                    |
| Kusla "                                             | 215 59 43                       | Fatehnagar, XXVII                                   | 179 8 17 92                     |                                                     |                                 |
| Maihar, I                                           | 217 51 44 80                    |                                                     |                                 |                                                     |                                 |
| Lakanpura, XIX*                                     | 260 4 20 44                     | BULANDPUR, XXXI                                     |                                 | DARAWAL, XXVIII                                     |                                 |
|                                                     |                                 | Sirwaia, XXIX                                       | 6 38 13 87                      | Parser, XXX                                         | 184 29 23 94                    |
| Asu, XXIV                                           |                                 | Parser, XXX                                         | 61 38 23 23                     | Sirwaia, XXIX                                       | 244 9 37 54                     |
| Nimkár, XXVI                                        | 180 51 27 76                    | Jarúrá, XXXII                                       | 129 29 27 37                    | Fatehnagar, XXVII                                   | 312 55 4 21                     |
| Barauli, XXV                                        | 251 1 1 66                      | Dahlelnagar, XXV†                                   | 174 25 2 96                     | Nimkár, XXVI                                        | 358 58 16 08                    |
| Etorá, XXIII                                        | 316 43 12 59                    |                                                     |                                 |                                                     |                                 |
| Bakseria, XXII                                      | 357 24 44 08                    |                                                     |                                 | DEWARSA, XVII                                       |                                 |
|                                                     |                                 | DAGRI, V                                            |                                 | Jáimau, XVIII                                       | 210 16 46 01                    |
|                                                     |                                 | Jáí Hill Mark                                       | 10 36 13                        | Máwa, XVI                                           | 269 19 0 13                     |
| BAKSERIA, XXII                                      |                                 | Dharkána, IV                                        | 18 35 58 44                     | Jahánabad, XV                                       | 341 37 24 30                    |
| Rau, XX                                             | 9 39 52 81                      | Dho Hill Mark                                       | 72 9 30                         |                                                     |                                 |
| Asu, XXIV                                           | 177 25 2 94                     | Sarang, VI                                          | 73 53 41 81                     | DHARKANA, IV                                        | 75 18 13                        |
| Etorá, XXIII                                        | 249 24 35 21                    | Kartár, VII                                         | 118 3 24 52                     | Dureha Hill Mark                                    | 127 23 41                       |
| Jhalotar, XXI                                       | 320 10 41 19                    | Marpha, VIII                                        | 181 9 45 30                     | Panna "                                             | 148 32 6 85                     |
|                                                     |                                 | Potenda, III                                        | 314 6 45 97                     | Sarang, VI                                          |                                 |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral. † Of the North-East Longitudinal Series.

15—L

† Of the North-East Longitudinal Series.

| Name of station with azimuths of surrounding points                                           | No. of triangle giving distance                                        | Name of station with azimuths of surrounding points                                                                                                | No. of triangle giving distance                                                                                             | Name of station with azimuths of surrounding points                                                                                                                                      | No. of triangle giving distance                                                                                          |
|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| PATRA, II<br>Lakanpura, XIX*<br>Mailhar, I<br>Kusla Hill Mark<br>Lálpahár, II<br>Potenda, III | 54 40 11 17<br>90 39 7 59<br>101 38 18<br>121 3 16<br>152 37 23 34     | RAU, XX<br>Cawnpore Church<br>Bakseria, XXII<br>Jhalotar, XXI<br>Namána, XIX                                                                       | 26 52 18<br>189 38 50 52<br>253 20 14 04<br>321 49 30 51                                                                    | SIHONDA, IX<br>Umri Hill Mark<br>Banda Mark<br>Papendi, XI<br>Pavia, X<br>Marpha, VIII                                                                                                   | 17 2 7<br>169 43 42<br>187 3 1 67<br>245 54 57 57<br>300 53 29 19                                                        |
| PAVIA, X<br>Marpha, VIII<br>Sihonda, IX<br>Banda Mark<br>Papendi, XI<br>Músapur, XII          | 5 35 48 89<br>66 4 37 75<br>92 44 11<br>119 58 16 07<br>164 36 5 81    | SARANG, VI<br>Dokhán Hill Mark<br>Murwari<br>Panna<br>Umri<br>Kartár, VII<br>Dágrí, V<br>Dho Hill Mark<br>Jáli<br>Dharkána, IV<br>Dureha Hill Mark | 7 1 45<br>8 11 35<br>72 8 33<br>170 9 59<br>176 14 5 68<br>253 45 9 66<br>261 57 10<br>265 3 2<br>328 27 10 43<br>341 13 36 | SIRWALA, XXIX<br>Darawal, XXVIII<br>Parser, XXX<br>Bulandpur, XXXI<br>Fatehnagar, XXVII                                                                                                  | 64 14 3 76<br>138 41 52 78<br>186 37 24 73<br>352 33 33 34                                                               |
| POTENDA, III<br>Lálpahár Hill Mark<br>Mailhar, I<br>Dharkána, IV<br>Dágrí, V<br>Patra, II     | 25 29 48<br>30 59 12 24<br>66 54 37 45<br>134 13 13 90<br>332 32 33 34 | SAVADA, S.<br>Cawnpore Church<br>Jáimau, XVIII                                                                                                     | 169 6 49<br>275 55 19                                                                                                       | TINDOTA h.s.<br>Lakanpura, XIX*<br>Sunwari Fort<br>Sarda Fort<br>Mailhar Palace<br>Mailhar, I<br>Unchehra Palace<br>Unchehra Temple<br>Shankargarh Fort<br>Jura Fort<br>Anarpátan Temple | 30 27 55<br>110 10 55<br>112 57 32<br>120 8 4<br>120 41 35<br>151 39 51<br>151 41 8<br>157 27 52<br>178 7 32<br>215 6 45 |
| RAU, XX<br>Jáimau, XVIII                                                                      | 9 46 7 32                                                              | SIHONDA, IX<br>Kartár, VII                                                                                                                         | 4 33 39 42                                                                                                                  |                                                                                                                                                                                          |                                                                                                                          |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

J. B. N. HENNESSEY,  
In charge of Computing Office.

November 1878.

## AMUA MERIDIONAL SERIES.

## CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— $\lambda$  stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically,  $H_s$  for the Height when found by spirit leveling, and  $h$  for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of  $\lambda$  and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c., secondary stations by the letters h.s. and s. The names in italics are those of the territories, states or districts in which the stations or points are situated. For alterations of district and other boundaries and consequent transfer of stations from one district to another since date of survey, see Addendum following page 8—L.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Amarpátan Temple.<br/>(<i>Baghelkhand, Rewah State</i>)</p> <p><math>\lambda</math> 24 18 41.6<br/>L 81 0 53.1<br/>No. 46</p> <p>Amúa, XVII.<br/>(<i>Maihar. Vide page 3—L.</i>)</p> <p><math>\lambda</math> 23 59 56.24<br/>L 80 31 44.44<br/>H 2113<br/><math>h</math> 4<br/>No. 1</p> <p>Asu, XXIV.<br/>(<i>Sandlla. Vide page 6—L.</i>)</p> <p><math>\lambda</math> 27 4 38.20<br/>L 80 31 14.26<br/>H 480<br/><math>h</math> 30<br/>No. 24</p> <p>Badanpur s.<br/>(<i>Baghelkhand, Maihar State</i>) In village.</p> <p><math>\lambda</math> 24 9 0.43<br/>L 80 51 36.44<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> | <p>Badanpur Temple,<br/>(<i>Baghelkhand, Maihar State</i>) Eastern.</p> <p><math>\lambda</math> 24 9 44.1<br/>L 80 52 17.7<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Bakseria, XXII.<br/>(<i>Lassipur. Vide page 6—L.</i>)</p> <p><math>\lambda</math> 26 50 52.91<br/>L 80 31 55.84<br/>H 430<br/><math>h</math> 15<br/>No. 22</p> <p>Bánda Mark.<br/>(<i>Bánda</i>)</p> <p><math>\lambda</math> 25 28 19.35<br/>L 80 22 4.03<br/>Nos. 62, 63</p> <p>Banjári Fort,<br/>(<i>Jubbulpore</i>) N. W. Angle.</p> <p><math>\lambda</math> 23 59 15.2<br/>L 80 39 21.0<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> | <p>Barauli, XXV.<br/>(<i>Sandlla. Vide page 6—L.</i>)</p> <p><math>\lambda</math> 27 8 17.01<br/>L 80 43 6.92<br/>H 464<br/><math>h</math> 30<br/>No. 25</p> <p>Bulandpur, XXXI.<br/>(<i>Khairabad. Vide page 7—L.</i>)</p> <p><math>\lambda</math> 27 51 11.46<br/>L 80 42 35.92<br/>H 504<br/><math>h</math> 24<br/>No. 31</p> <p>Cawnpore Church (Christ's),<br/>(<i>Cawnpore</i>) Centre of steeple.</p> <p><math>\lambda</math> 26 28 16.6<br/>L 80 23 45.0<br/>No. 64</p> <p>Chandor Hill Temple.<br/>(<i>Bánda</i>)</p> <p><math>\lambda</math> 25 10 21.9<br/>L 80 44 31.9<br/>No. 61</p> |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Dágri, V.<br/>(Nagode. Vide page 4—L.)</p> <p>λ 24 51 5·38<br/>L 80 44 7·31<br/>H 1588<br/>h 7<br/>No. 5</p> <p>Dahlelnagar, XXV.*<br/>(Muhamdi. Vide page 8—L.)</p> <p>λ 28 4 16·46<br/>L 80 41 9·41<br/>H 512<br/>h 28<br/>No. 33</p> <p>Darawal, XXVIII.<br/>(Khairabad. Vide page 7—L.)</p> <p>λ 27 33 35·96<br/>L 80 31 15·81<br/>Hs 473·28†<br/>h 30<br/>No. 28</p> <p>Deora Fort,<br/>(Jubbulpore) N.E. Bastion.</p> <p>λ 23 57 14·5<br/>L 80 34 41·9<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Deora Fort,<br/>(Jubbulpore) S.W. Bastion.</p> <p>λ 23 57 13·2<br/>L 80 34 40·3<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Dewarsán XVII.<br/>(Cawnpore. Vide page 5—L.)</p> <p>λ 26 15 52·89<br/>L 80 20 41·64<br/>H 439<br/>h 7<br/>No. 17</p> <p>Dharkána, IV.<br/>(Nagode. Vide page 4—L.)</p> <p>λ 24 28 0·81<br/>L 80 35 38·29<br/>H 1860<br/>h 2<br/>No. 4</p> <p>Dho Hill Mark.<br/>(Bundelkhand) On a peak of the Vindhyaçal range and about 3 miles S. of the small village of Bargari. It is denoted by a small platform with two centre mark-stones of which the lower is imbedded in the ground.</p> <p>λ 24 46 10·69<br/>L 80 27 27·54<br/>Nos. 56, 57</p> | <p>Dhobi Temple.<br/>(Jubbulpore)</p> <p>λ 24 2 47·9<br/>L 80 56 9·2<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Dokhán Hill Mark.<br/>(Bundelkhand) On a double-peaked hill about 3 miles south of Murwári. The hill is said to derive its name from its having two mines viz., one of copper and the other of iron. The former is reported to have been closed about a century ago lest its riches should attract the cupidity of the neighbouring Rájas. It is denoted by a platform 2½ feet high having two mark-stones with circle and dot engraved on them, the upper is at the surface of the platform and the other at level of ground.</p> <p>λ 24 17 18·82<br/>L 80 19 57·46<br/>No. 45</p> <p>Dureha Hill Mark.<br/>(Bundelkhand-Baghelkhand) On the northern extremity of the Rája's Puhár and immediately above the small village of Dureha. It is marked by a centre stone which is surmounted by a conical heap of stones.</p> <p>λ 24 26 50·73<br/>L 80 30 46·71<br/>No. 54</p> <p>Etorá, XXIII.<br/>(Sandila. Vide page 6—L.)</p> <p>λ 26 54 17·85<br/>L 80 42 5·44<br/>H 429<br/>h 18<br/>No. 23</p> <p>Etwa Tiled Building.<br/>(Baghelkhand, Rewah State)</p> <p>λ 24 10 18<br/>L 81 0 55<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Fatehnagar, XXVII.<br/>(Khairabad. Vide page 6—L.)</p> <p>λ 27 23 58·52<br/>L 80 42 51·05<br/>H 469<br/>h 35<br/>No. 27</p> <p>Ghunsí Masjid.<br/>(Kheri)</p> <p>λ 27 57 40·0<br/>L 80 33 53·1</p> <p>Jáfrabad, XIV.<br/>(Fatehpur. Vide page 5—L.)</p> <p>λ 26 0 43·97<br/>L 80 38 3·87<br/>H 423<br/>h 17<br/>No. 14</p> | <p>Jahánabad, XV.<br/>(Fatehpur. Vide page 5—L.)</p> <p>λ 26 6 3·35<br/>L 80 24 18·54<br/>H 435<br/>h Not forthcoming<br/>No. 15</p> <p>Jájman, XVIII.<br/>(Cawnpore. Vide page 5—L.)</p> <p>λ 26 25 51·52<br/>L 80 27 9·98<br/>Hs 461·67†<br/>h 8<br/>No. 18</p> <p>Jalhotr, XXI.<br/>(Rasúlábád. Vide page 6—L.)</p> <p>λ 26 41 37·85<br/>L 80 40 30·88<br/>H 440<br/>h 15<br/>No. 21</p> <p>Jáli Hill Mark.<br/>(Baghelkhand, Kothi State) On an isolated hill called Lehrára Puhár and about 2 miles N. of the small village of Jáli and 6 miles from Kothi. The mark is engraved on one of a mass of rocks forming the summit of the hill.</p> <p>λ 24 47 13·66<br/>L 80 43 19·79<br/>No. 58</p> <p>Járra Hill Mark.<br/>(Baghelkhand, Nagode State) On a small hill of the same name rising about 150 feet above the mass of Bundel flats. In its vicinity is the village of Tulaganu. It is marked by a platform 1 foot high with one centre stone.</p> <p>λ 24 16 22·29<br/>L 80 38 8·56<br/>Nos. 43, 44</p> <p>Jarúra, XXXII.<br/>(Muhamdi. Vide page 7—L.)</p> <p>λ 27 59 55·94<br/>L 80 30 38·13<br/>H 536<br/>h 28<br/>No. 32</p> <p>Jiwár h.s.<br/>(Jubbulpore)</p> <p>λ 23 56 29·15<br/>L 80 37 21·40<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Jukehi h.s.<br/>(Bundelkhand-Baghelkhand)</p> <p>λ 24 0 11·03<br/>L 80 27 36·81<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> |

\* Of the North-East Longitudinal Series.

† Refers to the mark-stone imbedded at the level of the ground, over which the tower has been built.

‡ Refers to the mark-stone let into the upper surface of the platform.



| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Jura Fort,<br/>(<i>Baghelkhand, Maihar State</i>) Bastion.</p> <p>λ 24 15 24.4<br/>L 80 55 31.8<br/>No. 38</p> <p>Kánákhera, XIII.<br/>(<i>Bánda. Vide page 5—L.</i>)</p> <p>λ 25 51 20.95<br/>L 80 27 58.79<br/>Hs 415.62†<br/>h 12<br/>No. 13</p> <p>Kanwára Fort,<br/>(<i>Jubbulpore</i>) N. W. angle.</p> <p>λ 23 55 19.9<br/>L 80 29 18.8<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Káritalai Fort,<br/>(<i>Jubbulpore</i>) S. W. angle.</p> <p>λ 24 3 15.5<br/>L 80 45 6.5<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Kartár, VII.<br/>(<i>Bánda. Vide page 4—L.</i>)</p> <p>λ 25 1 29.85<br/>L 80 22 38.18<br/>H 1123<br/>h 0<br/>No. 7</p> <p>Kokra, XXIII.*<br/>(<i>Muhamdi. Vide page 7—L.</i>)</p> <p>λ 28 12 7.34<br/>L 80 30 35.80<br/>H 519<br/>h 26<br/>No. 34</p> <p>Kusla Hill Mark.<br/>(<i>Baghelkhand, Nagode State</i>) On a high detached hill about 2 miles S. W. of the town of Unchehra and 6 miles N. of Maihar. It is marked by a platform about 7 feet high having two marks, the lower is engraved on the rock.</p> <p>λ 24 21 2.71<br/>L 80 48 29.37<br/>No. 48</p> <p>Lakanpúra, XIX.<br/>(<i>Maihar. Vide page 3—L.</i>)</p> <p>λ 24 2 49.92<br/>L 80 49 51.67<br/>H 1780<br/>h 4<br/>No. 1</p> | <p>Lálpahár Hill Mark.<br/>(<i>Baghelkhand</i>) On an isolated hill of that name, about 3 miles S. of the village of Bullanwára. The centre mark is engraved on the rock.</p> <p>λ 24 26 21.81<br/>L 80 53 49.93<br/>Nos. 52, 53</p> <p>Latágaon Tiled Building,<br/>(<i>Baghelkhand, Maihar State</i>) Southern.</p> <p>λ 24 5 51<br/>L 80 53 14<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Maihar, I.<br/>(<i>Maihar. Vide page 3—L.</i>)</p> <p>λ 24 17 0.34<br/>L 80 46 13.62<br/>H 1983<br/>h 2<br/>No. 1</p> <p>Maihar Palace.<br/>(<i>Baghelkhand, Maihar State</i>)</p> <p>λ 24 16 6.6<br/>L 80 47 42.2<br/>Nos. 41, 42</p> <p>Murpha, VIII.<br/>(<i>Bánda. Vide page 4—L.</i>)</p> <p>λ 25 7 2.29<br/>L 80 44 28.64<br/>H 1240<br/>h 5<br/>No. 8</p> <p>Máwa, XVI.<br/>(<i>Cawnpore. Vide page 5—L.</i>)</p> <p>λ 26 16 0.74<br/>L 80 33 47.94<br/>H 440<br/>h 24<br/>No. 16</p> <p>Muhamdi Fort.<br/>(<i>Kheri</i>) Flag on the highest paka building in fort, N.W. side of the town.</p> <p>λ 27 57 16.7<br/>L 80 14 56.3</p> <p>Murwári Hill Mark.<br/>(<i>Bundelkhand</i>) On a conical hill round the north and west of whose base extends a village of the same name. About 3 miles distant from the large village of Khonpa. It is marked by a platform about 2½ feet high having two mark-stones with circle and dot engraved on them, one at the surface of the platform, the other on a level with the surface of the hill.</p> <p>λ 24 20 7.53<br/>L 80 19 45.46<br/>No. 47</p> | <p>Músapur, XII.<br/>(<i>Fatehpur. Vide page 5—L.</i>)</p> <p>λ 25 46 34.62<br/>L 80 40 47.38<br/>H 406<br/>h 23<br/>No. 12</p> <p>Namána, XIX.<br/>(<i>Harha. Vide page 6—L.</i>)</p> <p>λ 26 28 10.63<br/>L 80 38 49.28<br/>H 449<br/>h 18<br/>No. 19</p> <p>Naugua h.s.<br/>(<i>Jubbulpore-Baghelkhand</i>)</p> <p>λ 24 4 56.25<br/>L 80 57 34.88<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Nimkár, XXVI.<br/>(<i>Khairabad. Vide page 6—L.</i>)</p> <p>λ 27 21 8.09<br/>L 80 31 30.85<br/>H 486<br/>h 30<br/>No. 26</p> <p>Palwa Temple.<br/>(<i>Baghelkhand, Maihar State</i>)</p> <p>λ 24 1 22.9<br/>L 80 29 4.2<br/>See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Panna Hill Mark.<br/>(<i>Bundelkhand</i>) On a hill immediately S. of the village of that name. The mark is on the top of a two storied shooting box built by the father of the present Rája (1834), the lower centre stone is sunk in the floor.</p> <p>λ 24 42 54.17<br/>L 80 14 16.65<br/>No. 55</p> <p>Paprendi, XI.<br/>(<i>Bánda. Vide page 5—L.</i>)</p> <p>λ 25 37 40.25<br/>L 80 26 45.41<br/>Hs † { 427.39<br/>-3<br/>h 10<br/>No. 11</p> |

\* Of the North-East Longitudinal Series. † Refers to the lower mark-stone imbedded at summit of the building, over which the tower has been carried up to a height of 12 feet. ‡ The height 424.39 refers as nearly as can be ascertained to the surface described on page 5—L.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Parser, XXX.<br/>(Muhamdi. Vide page 7—L.)</p> <p><math>\lambda</math> 27 46 16.81<br/> <math>L</math> 80 32 22.98<br/> <math>H_s</math> 484.70*<br/> <math>h</math> 24<br/> No. 30</p> <p>Pátol h.s.<br/>(Baghelkhand, Rewah State)</p> <p><math>\lambda</math> 24 14 47.17<br/> <math>L</math> 81 4 24.19<br/> No. 37</p> <p>Patra, II.<br/>(Rewah. Vide page 3—L.)</p> <p><math>\lambda</math> 24 16 46.74<br/> <math>L</math> 81 11 14.97<br/> <math>H</math> 2249<br/> <math>h</math> 2<br/> No. 2</p> <p>Pavia, X.<br/>(Bánda. Vide page 4—L.)</p> <p><math>\lambda</math> 25 27 17.39<br/> <math>L</math> 80 46 39.44<br/> <math>H</math> 481<br/> <math>h</math> 18<br/> No. 10</p> <p>Potenda, III.<br/>(Rewah. Vide page 4—L.)</p> <p><math>\lambda</math> 24 37 23.04<br/> <math>L</math> 80 59 34.36<br/> <math>H</math> 993<br/> <math>h</math> 2<br/> No. 3</p> <p>Raipur Masjid,<br/>(Kheri) Highest minaret.</p> <p><math>\lambda</math> 27 58 37.4<br/> <math>L</math> 80 33 0.8</p> <p>Rau, XX.<br/>(Rasulábad. Vide page 6—L.)</p> <p><math>\lambda</math> 26 38 42.61<br/> <math>L</math> 80 29 37.44<br/> <math>H_s</math> 429.42†<br/> <math>h</math> 16.5<br/> No. 20</p> | <p>Shankargarh Fort,<br/>(Baghelkhand, Nagode State) Square building.</p> <p><math>\lambda</math> 24 26 15.6<br/> <math>L</math> 80 49 8.3<br/> No. 51</p> <p>Sárang, VI.<br/>(Panna. Vide page 4—L.)</p> <p><math>\lambda</math> 24 45 42.20<br/> <math>L</math> 80 23 46.62<br/> <math>H</math> 1692<br/> <math>h</math> 3<br/> No. 6</p> <p>Sarda Fort,<br/>(Baghelkhand, Maihar State) High bastion gateway.</p> <p><math>\lambda</math> 24 15 38.7<br/> <math>L</math> 80 45 57.1<br/> Nos. 39, 40</p> <p>Saváda s.<br/>(Cawnpore)</p> <p><math>\lambda</math> 26 26 8.13<br/> <math>L</math> 80 24 12.47<br/> No. 65</p> <p>Sihonda, IX.<br/>(Bánda. Vide page 4—L.)</p> <p><math>\lambda</math> 25 18 9.78<br/> <math>L</math> 80 24 5.73<br/> <math>H</math> 849<br/> <math>h</math> Not forthcoming<br/> No. 9</p> <p>Sháhjahánpur City.<br/>(Sháhjahánpur) Kalas of Daul Khan's Rauza,<br/>mausoleum in city.</p> <p><math>\lambda</math> 27 52 59.3<br/> <math>L</math> 79 57 16.5</p> <p>Sháhjahánpur, Collector's Office.<br/>(Sháhjahánpur) Most northern skylight of the<br/>Magistrate and Collector's office.</p> <p><math>\lambda</math> 27 53 7.6<br/> <math>L</math> 79 57 40.5</p> <p>Sháhjahánpur, House.<br/>(Sháhjahánpur) Skylight of Mr. Barnes' paka house.</p> <p><math>\lambda</math> 27 53 36.0<br/> <math>L</math> 79 58 15.3</p> <p>Sháhjahánpur, Koti.<br/>(Sháhjahánpur) Staircase of Hakim Mendi's two<br/>storied house.</p> <p><math>\lambda</math> 27 53 53.6<br/> <math>L</math> 79 58 12.4</p> | <p>Sháhjahánpur, Rauza.<br/>(Sháhjahánpur) Kalas of Bahádur Khán's Rauza.</p> <p><math>\lambda</math> 27 52 59.4<br/> <math>L</math> 79 57 17.9</p> <p>Sháhjahánpur, Rosa Factory.<br/>(Sháhjahánpur) Conductor of the steam engine<br/>chimney of Rosa Sugar Works and Distillery.</p> <p><math>\lambda</math> 27 49 22.0<br/> <math>L</math> 79 57 27.0</p> <p>Singondi Temple,<br/>(Jubbulpore) Black.</p> <p><math>\lambda</math> 23 56 6.6<br/> <math>L</math> 80 42 50.2<br/> See Synoptical Vol. of the Calcutta Longl. Series.</p> <p>Sirwaia, XXIX.<br/>(Khairabad. Vide page 7—L.)</p> <p><math>\lambda</math> 27 37 43.43<br/> <math>L</math> 80 40 50.34<br/> <math>H_s</math> 471.61*<br/> <math>h</math> 30<br/> No. 29</p> <p>Sunwári Fort,<br/>(Baghelkhand, Maihar State) N.W. angle.</p> <p><math>\lambda</math> 24 13 41.2<br/> <math>L</math> 80 50 17.5<br/> No. 36</p> <p>Tíndota h.s.<br/>(Baghelkhand, Maihar State)</p> <p><math>\lambda</math> 24 11 52.83<br/> <math>L</math> 80 55 39.37<br/> No. 35</p> <p>Unchehra Palace.<br/>(Baghelkhand, Unchehra State)</p> <p><math>\lambda</math> 24 22 57.1<br/> <math>L</math> 80 49 8.2<br/> No. 50</p> <p>Unchehra Temple.<br/>(Baghelkhand, Unchehra State)</p> <p><math>\lambda</math> 24 22 56.6<br/> <math>L</math> 80 49 8.8<br/> No. 49</p> <p>Umri Hill Mark.<br/>(Bundelkhand, Charkhári State)</p> <p><math>\lambda</math> 25 5 49.81<br/> <math>L</math> 80 19 56.74<br/> Nos. 59, 60</p> |

\* Refers to the mark-stone imbedded at the level of the ground, over which the tower has been built.

† Refers to the mark-stone imbedded at the level of the

November 1878.

J. B. N. HENNESSEY,  
In charge of Computing Office.

**KARARA MERIDIONAL SERIES.**



## KARARA MERIDIONAL SERIES.

## INTRODUCTION.

The Karára Series is the fourth in order—reckoning eastwards from the Northern Section of the Great Arc—of the Meridional chains of triangles included in the North-East Quadrilateral. It emanates at the side Karára-Marwás of the Calcutta Longitudinal Series—in Baghelkhand, south of the river Son, (Soane)—and follows the meridian of Karára,  $81^{\circ} 18'$ , as closely as the nature of the country permitted. It spans a meridional distance of about 250 miles, and though commenced in the field season of 1837-38 was not brought to a close until 1844-45.

For the first 110 miles of its length, the Series is carried as a double chain of triangles traversing portions of the Districts of Allahabad, Banda and Fatehpur, and of the Native States of Rewah, Soháwal and Panna. The first 90 miles are situated on the Kaimúr range and the high land which, generally speaking, forms the southern watershed of the Gangetic plain between the meridians of  $81^{\circ}$  and  $82^{\circ}$ : the remaining 20 miles cross the lower end of the Doáb between the Jumna and the Ganges. The Series is thereafter continued as a chain formed for the most part of single triangles, through portions of the Districts of Rae Bareilly, Bara Banki, Sitapur and Partabgarh, in the Province of Oudh, and it terminates at the side Khánpur-Mási of the North-East Longitudinal Series, in the plains at the feet of the Himalayan Mountains.

In January 1838 Lieutenant Jones of the Bengal Engineers, who was then employed

*Season 1837-38.*

## PERSONNEL.

Lieut. W. Jones, Bengal Engineers, 1st Asst.  
Mr. J. Scully, 2nd Class Sub-Assistant.

on the measurement of the Sironj Base-Line, was directed by the Surveyor General to organize a small native establishment and make all other necessary preparations with a view to commencing the Karára Series before the close of

the current field season. Owing to the paucity of officers available only one assistant could be attached to the party.

The party arrived at Karára on the 1st of March, when Lieutenant Jones and Mr. Scully immediately commenced selecting stations for the required triangulation. In those early days of the survey the opinion was generally held that the links composing a chain of principal triangles should be the fewest possible, and therefore that the sides of the triangles should not be less than 20 miles in length. This restriction, coupled with the prescribed

conditions for securing symmetry, hampered Lieutenant Jones greatly and materially retarded his progress. Thus, writing to the Surveyor General on the 18th May, he reports that "both the result of a minute examination of the ground as far as 60 miles to the north of "Karára and the repeated failures I have met with in my attempts to procure good and "symmetrical triangles compel me to state that I do not expect to succeed in producing such "work as I could wish, and as I feel that you will expect from me". Of one side Kaimúr-Jaliádhār, the shortness of which—seventeen miles—seems to have been a source of considerable concern to him, he says "it was not adopted until I had used every endeavour "during six weeks to get a better one,—until I had myself visited every part of the range "that appeared to offer the remotest chance of success, and cleared much of the heavy jungle "which considerably increases the difficulty of finding two points on this range mutually "visible and yet sufficiently distant". Eventually these difficulties led him to recommend the extension of the "work to the northward by a double series or succession of polygons using short sides"; this was assented to by the Surveyor General as being "very feasible and proper". Five principal stations had been selected by the commencement of June, when the rainy season commenced and sickness broke out in the camp. Lieutenant Jones thereupon proceeded to recess quarters at Allahabad.

Lieutenant Jones marched out of Allahabad on the 1st October; but before he had

Season 1838-39.

PERSONNEL.

Lieut. W. Jones, Bengal Engineers, 1st Asst.  
Mr. J. Scully, 1st Class Sub-Assistant.

fairly resumed work, the whole camp was seized with jungle fever which compelled him to return to Allahabad. Mr. Scully fell a victim to the disease, and died on the 18th November: Lieutenant Jones himself and the entire

native establishment were reduced to such a state of prostration as to leave the Surveyor General no alternative but to suspend the operations, and direct Lieutenant Jones to proceed when sufficiently recovered to join him at Kaliána, where he might be suitably employed in learning the use of the Great Astronomical Circles which were employed on the Great Arc in obtaining determinations of latitude for geodetic requirements; one of these instruments was then being employed there, simultaneously with another at Kaliánpur, in determining the differential latitude, or arc of amplitude between the two stations.

At the commencement of the field season of 1839-40 Lieutenant Jones again proceeded to resume the Karára Series, with the aid of two assistants, Messrs. C. Lane and J. W. Rossenrode; but on the third march from the Head Quarters in Dehra Dún he was taken so seriously ill with jungle fever, that he had to abandon the undertaking, take sick leave, and eventually resign his appointment in the Survey Department.

During the recess of 1841 Captain R. Shortrede—of the Bombay Army—was appointed

Season 1841-42.

PERSONNEL.

Captain R. Shortrede, 2nd Bombay European  
Regiment, 1st Assistant.  
Babu Ramdial De, 3rd Class Sub-Assistant.  
Mr. D. Kirwan, do. do.

to conduct the Series, and to organize an establishment for the resumption of the work from the point where it had been left by Lieutenant Jones three years previously. The party left the Head Quarters in Dehra Dún early in October; but, owing to various delays and mishaps, it did not reach the first station of operation, Jaliádhār, until the 8th of February, when

the most favorable season of the year for observing had already gone by, and the opportunity was thus lost for pushing the work across a malarious tract of country in which an outbreak of sickness might at any time compel the party to leave the field. The remainder of the month was spent in clearing hill summits of forest. The next month was for the most part spent at the station of Marwás, where Captain Shortrede hoped to commence the observations of the principal angles; but the haziness of the atmosphere rendered all the signals—both lamps and heliotropes—to be wholly invisible. Captain Shortrede therefore moved on to Karára, where the atmosphere proved to be even worse than at Marwás, so that no terrestrial angles could be observed. “On some days”, wrote Captain Shortrede, “I could scarcely see the hill at about two miles distance on which I had the referring-mark”. On one day the Marwás heliotrope was seen, but it was flaring and unsteady to such a degree that not a single satisfactory measure of the angle between it and the referring-mark could be got. A complete set of angles between a referring-mark and a circumpolar star was however measured here, in order to obtain a direct astronomical determination of the azimuth at Karára, to be employed as the fundamental azimuth of the Series in lieu of the value of azimuth which had been brought up from Sironj through the Calcutta Longitudinal Series. It consisted of two measures of the angle between the mark and the star on each of 12 ‘zeros’, or settings of the horizontal circle of the principal theodolite, Troughton and Simms’ 18-inch No. 1.\* Complete sets of observations were taken at both elongations of the star, and very satisfactorily; but they form the sum total of the work of final observing which was accomplished during this season. They were concluded on the 8th of April, when Captain Shortrede proceeded to recess quarters at Allahabad, reporting that in the existing state of the weather and with a sick list continually increasing (he had already lost 7 men of his establishment, and had 20 others sick in hospital) he felt that it would be an unwarrantable exposure of human life to remain longer in the field, and that it was his duty to move for the recess season into Allahabad, where the sick might have a better chance of recovery.

In the following field season the party, strengthened by Mr. J. W. Armstrong—who

*Season 1842-43.*

PERSONNEL.

|                          |                          |
|--------------------------|--------------------------|
| Captain R. Shortrede,    | 2nd Bombay European      |
| Regiment, 1st Assistant. |                          |
| Mr. J. W. Armstrong,     | 1st Class Sub-Assistant. |
| Babu Rundial Do,         | 3rd do.                  |
| Mr. D. Kirwan,           | do. do.                  |

had acquired considerable experience in the principal triangulation, having been employed for some time on the Rangir Series—left Allahabad on the 15th of November 1842, and made such good progress that by the end of the field season all the stations south of the Jumna had been selected, and the principal observations had been completed

for a distance of about 65 miles from the side of origin.

But the general design of the triangulation as laid out by Captain Shortrede differed materially from what had originally been intended by Colonel Everest, in that it consisted of a continuous net-work of triangles in which mutual observations were taken between all stations—however far apart—that happened to be mutually visible, instead of forming a succession of simple polygonal figures in which the mutual observations were restricted to the

---

\* For a description of this instrument see pages 61 to 64 of the Appendices to Vol. II, and for an account of its peculiarities see page 96, and Appendix No. 4 of the same volume.

stations lying contiguous to each other. Theoretically of course the net-work is the best, as it ties the triangulation together more thoroughly; but practically it is far the most troublesome and tedious, to execute originally, and to treat eventually in the course of the general reduction of the triangulation; it is moreover very variable in its influence, tending to strengthen some portions of the net-work much more than other portions. For these reasons it had been deliberately rejected by Colonel Everest in favour of the simpler system of successive independent geometrical figures, which had been introduced on all the other chains of triangles executed up to that time, and has since been uniformly adopted.

On the termination of the field season the party retired to recess quarters at Allahabad where it arrived on the 2nd of June.

Field operations were resumed on the 1st November, Captain Shortrede having mean-

*Season 1843-44.*

PERSONNEL.

|                          |                          |
|--------------------------|--------------------------|
| Captain R. Shortrede,    | 2nd Bombay European      |
| Regiment, 1st Assistant. |                          |
| Mr. J. W. Armstrong,     | 1st Class Sub-Assistant. |
| " D. Kirwan,             | 2nd " "                  |
| Babu Ramdial De,         | 3rd " "                  |

while suggested that the triangulation should be extended over the plains to the north as a chain of single triangles, thus departing not only from his original net-work which had become quite impracticable, but from the simple polygonal form which might have been adopted. Captain

Waugh, who had then succeeded Colonel Everest as Surveyor General, directed that the polygonal system should be adhered to as far as practicable; but that if much progress had already been made in laying out the Series as a chain of single triangles, it would not be right to incur the expense and delay which the abandonment of work already performed would occasion; otherwise, as there was no special difficulty in carrying the polygonal system over the country in which the operations were being conducted, he particularly wished that that system should not be departed from.

The selection of stations for a principal triangulation over a perfectly level plain—more particularly when richly cultivated and covered with towns, villages and trees—is, however, an undertaking which requires considerable practical experience, so that surveyors who have been operating for years with great success in a hilly country, may find themselves completely baffled and unable to advance, when they enter on an extensive plain covered with obstacles to distant vision and wholly devoid of commanding eminences. Thus in the early days of this Survey some years elapsed before the most appropriate method of operating in such plains was fully elaborated, as will be seen on reference to Section 3 of Chapter II of Volume II which gives a historical sketch of the successive methods adopted for the selection of stations. Captain Shortrede and his assistants had not as yet become sufficiently acquainted with the proper methods of procedure, and thus the selection of stations and the clearing of the lines between them proceeded very slowly; thus, during this season only five new stations were selected and prepared, by the construction of a tower\* at each, as points of observation, and of these stations two were afterwards rejected; the measurement of the principal angles was correspondingly retarded, observations being taken at three stations only, *viz.*, Lálapur, Bagála and Pabhosa.

---

\* NOTE.—The average height of these five towers was 32 feet; the average time occupied in their construction was a month and twenty days; and their average cost 440 Rupees.



Captain Waugh, having called for copies of the angle books containing the observations of the last two seasons, found that Captain Shortrede had departed from the system of observing which had been introduced by Colonel Everest and was then generally practised in this Survey,\* and of which it was a leading feature that two or more observations of every angle should be made at each zero-setting of the azimuthal circle, and the mean taken, the whole being recorded separately from the observations at the other zero-settings. Captain Shortrede took only one observation of an angle at each zero-setting, and he combined the pairs of single observations which were taken at  $180^\circ$  apart—with reversed faces—into one, as if both had been taken on a single zero. By this means his observations escaped criticism, as they were never repeated on the same divisions of the circle, and they became to all appearances much more accordant, having been combined together in a way that—as it so happened†—concealed a large portion of the instrumental error, which was obviously objectionable.

Captain Waugh moreover found that the reduction of the net-work of triangulation, which has already been mentioned, would require the simultaneous solution of about 200 equations of condition, the labour of which would be quite out of proportion to the value of the results; he therefore directed the exclusion of certain stations and the omission of all observations which were redundant, thereby reducing the principal triangulation of the Series to the form in which it now appears; all redundant stations were treated as secondaries.

In order to expedite the completion of the Series, Captain Waugh deputed a second

*Season 1844-45.*

PERSONNEL.

|                      |   |                                                                           |
|----------------------|---|---------------------------------------------------------------------------|
| Southern<br>Section. | { | Captain R. Shortrede, 2nd Bombay Euro-<br>pean Regiment, 1st Assistant.   |
|                      |   | Mr. J. W. Armstrong, 3rd Principal Sub-<br>Assistant.                     |
|                      |   | Mr. D. Kirwan, 2nd Class Sub-Assistant.                                   |
|                      |   | „ J. B. N. Honnessey, 3rd Class Sub-<br>Assistant.                        |
| Northern<br>Section. | { | Captain J.S. Du'Vernet, 2nd Madras Euro-<br>pean Regiment, 1st Assistant. |
|                      |   | Mr. J. Mulheran, 1st Class Sub-Assistant.                                 |
|                      |   | „ W. Glynn, 2nd „ „                                                       |

party, under Captain J. S. Du'Vernet, to operate at the northern end during the field season of 1844-45, commencing at a side of 'the North Connecting Series'—now known as the North-East Longitudinal Series—which had been established during the previous field season, in close proximity to the Karára meridian. He also directed the abandonment of polygonal figures and the adoption of single triangles, in both sections of the Series, "whereby the operations will be greatly accelerated, although this object will be only obtained at the sacrifice of some degree of

precision"; he enjoined however that the single triangles were to be laid out "with every attention to symmetry and elegance".

The direct distance between the parallel up to which the triangulation had been completed, and the side of the 'North Connecting Series' on which it was intended to close, was about 160 miles. In this distance about 25 miles had been already prepared in the southern section by the construction of tower stations, and opening the lines between them, during the previous field season. In the northern section however no preparations had been made; nevertheless Captain Du'Vernet succeeded in carrying his triangulation down to the side Sora-Janai, thus completing a chain of 15 triangles which extended over a

\* For full particulars of this system see Section 2 of Chapter II, Volume II, and for a brief outline see Section 1 of Chapter II of Volume VII.

† For an explanation of this see page 96 and Appendix 4 of Volume II.

direct distance of about 90 miles in a single field season, and executing much more than half the amount of work which remained to be accomplished.

In the southern section matters did not at first progress equally satisfactorily. When the better part of the field season was over, Captain Shortrede's services were placed at the disposal of the Bombay Government for other duties, and the charge of the party was made over to Mr. J. W. Armstrong. He set to work with great vigour to complete this section by carrying it up to the side to which the northern section was being brought down by Captain Du'Vernet; and by dint of great perseverance, and continuing to operate in the field until the middle of July, long after the hot weather had set in, he succeeded not only in accomplishing the task which he had undertaken, but in revising some angles of which the previous measures were discordant and unsatisfactory, and in improving a group of single unsymmetrical triangles by converting it into a tetragon. He also observed an azimuth of verification at Pabhosa.

The 18-inch Theodolite by Troughton and Simms which had hitherto been used by Captain Shortrede, was replaced at the commencement of this season by an 18-inch Theodolite by Cary, which had originally been obtained from the Madras Observatory and is described at page 68 of the Appendices to Volume II. But this instrument being also deemed unsatisfactory was replaced, in the month of April, by Harris and Barrow's 15-inch Theodolite, which had given very satisfactory results in Mr. Armstrong's hands on the Rangir Series, and is described at page 72 of the Appendices to Volume II.

The measurement of the principal angles in the northern section was executed by Captain Du'Vernet, with Saiyad Mir Mohsin's 18-inch Theodolite, described at page 67 of the Appendices to Volume II.

By the completion of the Karára Series the circuit of triangles which is formed by the Northern Section of the Great Arc and the Karára Series, and the sections of the two longitudinal chains at their extremities by which the two meridional chains are connected together, was also completed. The values of the closing errors as derived from the calculations of that time—which however were only approximate and preliminary to the final reductions—were small in latitude and longitude, but so large in side and azimuth that Captain Waugh proceeded in person to the station of Sora, at the side of junction between the two sections of the series, and determined an azimuth of verification there, by astronomical observations with the theodolite used by Captain Du'Vernet. The results led him to the conclusion that the southern portion of the Karára Series was the more defective of the two. Still however he was of opinion that the closing errors were “evidently of an accumulative character, arising in fact from a want of minute precision in the instrumental means employed, and therefore only to be remedied by a revision of the work with superior means”. The errors however were insignificant from a geographical point of view, and would exercise no effect on the Indian Atlas; they were also too minute to influence local topographical and revenue survey operations. Thus the Surveyor General, though distressed by their magnitude, concluded that he would not be “justified in recommending a revision of the work, because an urgent necessity exists for extending the trigonometrical opera-

“tions over other parts of the country remaining to be triangulated”.

On the completion of the Simultaneous Reduction of the North-East Quadrilateral, it was found that the errors which had actually been dispersed over the Karára Series, between the origin Karára-Marwás and terminus Khánpur-Mási, were as follows:—

|         |   |                                                         |     |     |     |                |
|---------|---|---------------------------------------------------------|-----|-----|-----|----------------|
| In side | { | Logarithm                                               | ... | ... | ... | + 0·000,0508,7 |
|         |   | giving a ratio of about $7\frac{1}{2}$ inches per mile. |     |     |     |                |
| „       |   | Latitude                                                | ... | ... | ... | + 0"·826       |
| „       |   | Longitude                                               | ... | ... | ... | + 0·047        |
| „       |   | Azimuth                                                 | ... | ... | ... | — 7·833        |

The trigonometrical determinations of the heights of the stations of this Series above the mean sea level, have been corrected by connecting the stations, wherever possible, with the lines of spirit levels which have been executed of late years in the course of operations in the Trigonometrical and the Revenue branches of the Survey Department. A list of the stations which have been so connected will be found on page 55—*M*; a statement of the several sections into which the Series is divided, as well as the method of adjustment employed is detailed on page 39 of Part I of Volume VII. It will here suffice to state that the spirit levels show that occasional errors of a magnitude which reaches a maximum of 7·7 feet have been made in the trigonometrical determinations of differences of level between contiguous stations; but in the long run these errors have a tendency to cancel each other, the total error generated between the sides of origin and terminus being less than the maximum single error.

#### *Secondary Triangulation.*

In the southern portion of the Series the principal stations are all situated on hills, and here therefore the secondary triangulation consists of the measurement of angles at those stations to fix all the most prominent and important points visible from them, such as the temples in Rewah. The angles were measured with the 18-inch theodolite which was employed for the principal triangulation. Usually two angles only of each triangle were measured, the point itself being unvisited; but in a few instances the points are stations of the net-work of triangulation which was primarily designed by Captain Shortrede and afterwards converted into a chain of simple consecutive figures by the elimination of superfluous stations; in these instances the third angle also was measured with the 18-inch theodolite.

On entering the plains it became necessary to fix points in and around the important city of Allahabad, lying about 20 miles to the east of the Series. Observations were taken from the stations of Bagála (XII) and Singraur (XV), with the 18-inch theodolite, which fixed a station in the Fort and the steeple of the Church, and thus furnished a base around which a minor triangulation was executed—probably with a 12-inch theodolite—by Mr. Mulheran when residing in Allahabad during the recess of 1845. In the following field season a chain of secondary triangles was carried up the Ganges from Mirzapore to Allahabad—

as a part of the operations of the Gurwáni Series—and extended to Singraur (XV), by Mr. Glynn; a branch chain was carried by Mr. Mulheran from Allahabad to Bagála (XII), passing through and connecting with his triangulation of the preceding year; both chains were executed with 12-inch theodolites. These triangulations have been adjusted to fit between the finally determined position-values of the principal stations of the two series on which they rest; the portion including and lying to the west of Allahabad is now published as appertaining to the Karára Series, while that to the east has been allotted to the Gurwáni Series.

A few secondary points were fixed in the vicinity of the side Karra (XVI) to Pariáon (XVIII) by a ray-trace triangulation executed by Mr. Mulheran in 1845. In the same year a point in the town of Rae Bareli, and a few other secondary points, were fixed by ray-trace triangulations depending on the sides Sora (XXIV) to Janai (XXV), Thána (XXXVII) to Imlia (XXXVI), and the terminal side Khánpur to Mási, in connection with Captain Du'Vernet's operations.

In 1845 Mr. Glynn was deputed by Captain Du'Vernet to carry a series of triangles with a 12-inch theodolite, from the side Pesar (XXX) to Utiámau (XXXII) up to the city of Lucknow, in order to fix points of importance in and around that city. It was supplemented and extended a few months subsequently by Mr. Mulheran. The stations of the triangulation not having been permanently marked are not now forthcoming; consequently the usual data of the triangles are not given, but merely the latitudes and longitudes of the domes, buildings and other permanent marks of which the positions were determined\*.

In season 1852-53 a chain of secondary triangles was carried up the Gogra River, in connection with the operations of the Huríláong Meridional Series; it crosses the terminal side of the Karára Series, and connects with the station of Mási, at the eastern extremity of that side. The details appertaining to stations No. 164 to 217 of this river triangulation are now published as a portion of the Karára Series. The angles were measured with a 12-inch theodolite by Mr. Belletty. This triangulation has been adjusted to fit exactly between the finally determined position-values of the station Mási and the station Orejhár, the latter being No. XXIV of the Gurwáni Series.

C. WOOD,

*Surveyor 2nd Grade.*

MUSSOOREE: }  
May 1881. }

\* One of these was the site of the transit telescope in the Royal Observatory, the astronomically determined position of which—as deduced by Lieut-Colonel Wilcox—was as follows:—

Latitude  $26^{\circ} 51' 17''\cdot 8$ , by observations with the mural circle in 1842.  
Longitude  $80^{\circ} 59' 11''\cdot 4$ , by observations on moon culminating stars in 1841.

The corresponding trigonometrically deduced values are { Lat.  $26^{\circ} 51' 12''\cdot 9$   
Long.  $80^{\circ} 58' 57''\cdot 6$

Thus the astronomical determination of latitude exceeds the trigonometrical by  $4''\cdot 9$ , which shows that—assuming both to be exact—the proximate local attractions to the south are more influential on the direction of the plumb line in Lucknow than the attraction of the distant Himalayan ranges to the north. The astronomical determination of longitude differs from the trigonometrical by less than  $14''$ ; the latter rests on an astronomical determination at Madras which was made within a few years of the one at Lucknow—see Chapter XI of Vol. II—and is now known to be about  $2' 30''$  in excess of the true longitude from Greenwich; thus it seems probable that the astronomical longitudes of Madras and Lucknow were both affected in a nearly equal degree by the errors of the then existing Lunar Tables.

## KARARA MERIDIONAL SERIES.

1—M.

## ALPHABETICAL LIST OF STATIONS.

|                                      |          |                                    |         |
|--------------------------------------|----------|------------------------------------|---------|
| Amoli . . . . .                      | XXXIII.  | Marwás . . . . .                   | XXVI.   |
| Asrafpúr . . . . .                   | XXXVIII. | (of Calcutta Longitudinal Series). |         |
| Bagála . . . . .                     | XII.     | Mhao . . . . .                     | X.      |
| Basantpúr . . . . .                  | XXIX.    | Munai . . . . .                    | XXIII.  |
| Burwa . . . . .                      | V.       | Nagdílúp . . . . .                 | XIV.    |
| Dádar . . . . .                      | III.     | Náru . . . . .                     | IV.     |
| Doñri . . . . .                      | VII.     | Pabhosa . . . . .                  | XIII.   |
| Horesa . . . . .                     | XIX.     | Parewa . . . . .                   | XXVIII. |
| Imlía . . . . .                      | XXXVI.   | Pariáoñ . . . . .                  | XVIII.  |
| Jalíádhār . . . . .                  | II.      | Pesar . . . . .                    | XXX.    |
| Janai . . . . .                      | XXV.     | Ragaopúr . . . . .                 | XXXV.   |
| Kachúr . . . . .                     | IX.      | Sálaon . . . . .                   | XX.     |
| Kaimúr . . . . .                     | I.       | Samnadío . . . . .                 | XXXIV.  |
| Karára . . . . .                     | XXIII.   | Singraor . . . . .                 | XV.     |
| (of Calcutta Longitudinal Series).   |          | Sirmaol . . . . .                  | VIII.   |
| Karra . . . . .                      | XVI.     | Sora . . . . .                     | XXIV.   |
| Khánpúr . . . . .                    | XXXIV.   | Tánger . . . . .                   | XXI.    |
| (of North-East Longitudinal Series). |          | Taoli . . . . .                    | XXVI.   |
| Khára . . . . .                      | XXII.    | Thána . . . . .                    | XXXVII. |
| Kotar Kaimári . . . . .              | VI.      | Tikiri . . . . .                   | XXVII.  |
| Lálápúr . . . . .                    | XI.      | Turkani . . . . .                  | XXXI.   |
| Majilgáoñ . . . . .                  | XVII.    | Utíámáo . . . . .                  | XXXII.  |
| Mási . . . . .                       | XXXV.    |                                    |         |
| (of North-East Longitudinal Series). |          |                                    |         |

## KARARA MERIDIONAL SERIES.

## NUMERICAL LIST OF STATIONS.

|       |   |   |   |                                    |         |   |   |   |                                      |
|-------|---|---|---|------------------------------------|---------|---|---|---|--------------------------------------|
| XXIII | . | . | . | Karára.                            | XX      | . | . | . | Sálaon.                              |
|       |   |   |   | (of Calcutta Longitudinal Series). |         |   |   |   |                                      |
| XXVI  | . | . | . | Marwás.                            | XXI     | . | . | . | Tángan.                              |
|       |   |   |   | (of Calcutta Longitudinal Series). |         |   |   |   |                                      |
| I     | . | . | . | Kaimúr.                            | XXII    | . | . | . | Khára.                               |
| II    | . | . | . | Jalíádhár.                         | XXIII   | . | . | . | Munai.                               |
| III   | . | . | . | Dádar.                             | XXIV    | . | . | . | Sora.                                |
| IV    | . | . | . | Náru.                              | XXV     | . | . | . | Janai.                               |
| V     | . | . | . | Burwa.                             | XXVI    | . | . | . | Taoli.                               |
| VI    | . | . | . | Kotar Kaimári.                     | XXVII   | . | . | . | Tikiri.                              |
| VII   | . | . | . | Doñri.                             | XXVIII  | . | . | . | Parewa.                              |
| VIII  | . | . | . | Sirmaol.                           | XXIX    | . | . | . | Basantpúr.                           |
| IX    | . | . | . | Kachár.                            | XXX     | . | . | . | Pesar.                               |
| X     | . | . | . | Mhao.                              | XXXI    | . | . | . | Turkani.                             |
| XI    | . | . | . | Lálápúr.                           | XXXII   | . | . | . | Utíámáo.                             |
| XII   | . | . | . | Bagála.                            | XXXIII  | . | . | . | Amoli.                               |
| XIII  | . | . | . | Pabhosa.                           | XXXIV   | . | . | . | Samnadío.                            |
| XIV   | . | . | . | Nagdílápúr.                        | XXXV    | . | . | . | Ragaopúr.                            |
| XV    | . | . | . | Singraor.                          | XXXVI   | . | . | . | Imlíá.                               |
| XVI   | . | . | . | Karra.                             | XXXVII  | . | . | . | Thána.                               |
| XVII. | . | . | . | Majilgáoñ.                         | XXXVIII | . | . | . | Asrafpúr.                            |
| XVIII | . | . | . | Pariáoñ.                           | XXXIV   | . | . | . | Khánpúr.                             |
|       |   |   |   |                                    |         |   |   |   | (of North-East Longitudinal Series). |
| XIX   | . | . | . | Horesa.                            | XXXV    | . | . | . | Mási.                                |
|       |   |   |   |                                    |         |   |   |   | (of North-East Longitudinal Series). |

## KARARA MERIDIONAL SERIES.

### DESCRIPTION OF PRINCIPAL STATIONS.



Of the 38 Principal Stations composing this Series, the 13 southernmost, as also the 2 initial stations, are on hills, and consist generally of low solid platforms, each carrying a mark at its upper surface and having a corresponding mark below; in a few instances the station is denoted by a pile of stones, on which the usual mark of a circle and dot is fixed, or in the absence of any platform this mark is engraved on the rock *in situ*. When the Series entered on the plains, suitable artificial elevations had to be constructed, as usual, to admit of overlooking the curvature of the globe. At the first 10 stations, each of these structures consists of a basement 28 to 32 feet in diameter and 3 to 6 feet high, with a mark-stone fixed in its upper surface; this surface carries a masonry pillar, which in some instances is solid and includes at least one mark-stone and in others is perforated throughout its length: the pillar is either square or circular at base and 7 to 8 feet in width, terminating at top in a circle 4 feet in diameter; it is enclosed in a tower of unburnt bricks varying in diameter from 20 to 27 feet at base and from 16 to 21 feet at top: the tower is commonly faced with burnt brick as a protection against rain. At each of the remaining 15 stations of the Series as well as at the 2 terminal stations, the internal masonry pillar is without exception of the solid kind, while the external diameter of the tower varies from 17 to 22 feet at base and from 11 to 14 feet at top: the structure at one of these terminal stations, *viz.* Mási, underwent considerable alteration when revisited in course of the operations of the North-East Longitudinal Series.

The following descriptions have been compiled from those given in the original MS. General Report and other original records of this Series, supplemented in respect to the neighboring villages by information obtained from the Revenue and Topographical Survey maps of the country traversed. The information as to the local sub-divisions in which the several stations occur has been derived from the latest Annual Reports received from the District officers to whose charge the stations have been committed.

XXIII.—(*Of the Calcutta Longitudinal Series*). Karára Hill Station, lat.  $24^{\circ} 5'$ , long.  $81^{\circ} 18'$ —observed at in 1827, 1842 and 1865—is situated on the highest point of a small range of hills running north-east and south-west, and is distant about 3 miles E.N.E. of the village of Karára; pargana Mádhogharh of the

## Rewah territories.

The pillar is solid and contains two marks, the upper 3·0 feet above the lower, which is engraved on the rock *in situ*, having been placed there in 1827. The station was revisited in 1842 for the purpose of originating the Karára Meridional Series, but no alteration in its construction appears to have been made. On again visiting it in 1865, the upper mark was found displaced, and a new pillar carrying a mark-stone at summit in the normal of the old lower mark was then built to the same height as before. The distances and bearings of surrounding villages are:—Dal 1·6 miles W. by N.; Harai 1·8 miles E. by S.; and Mer 1·4 miles S.W.

XXVI.—(*Of the Calcutta Longitudinal Series*). Marwás Hill Station, lat.  $24^{\circ} 5'$ , long.  $81^{\circ} 49'$ —observed at in 1827, 1828, 1842 and 1865—is situated on a range of hills running east and west about 2 miles S.S.W. of the town of Marwás; pargana Marwás of the Rewah territories.

The pillar is solid and contains two marks, the upper 3·6 feet above the lower which is engraved on the rock *in situ*, having been placed there in 1827. The station was revisited in 1842 for the purpose of originating the Karára Meridional Series, but no alteration appears to have been made in its construction. On again visiting it in 1865, the upper mark-stone was found undisturbed, and a new pillar was then built to the same height as before. The distances and bearings of neighboring villages are:—Amarha 0·9 mile N.W. by N.; and Sondia 2·2 miles N.E. by E.

I. Kaimúr Hill Station, lat.  $24^{\circ} 17'$ , long.  $81^{\circ} 12'$ —observed at in 1843—is situated on the flat top of a hill so called, and is distant about half a mile S.W. of a tank; pargana Gurha of the Rewah territories.

The station consists of a pile of stones 6 feet high, and is marked as usual with a circle and dot. The distances and bearings of surrounding villages are:—Bagdhari 1·8 miles S.W. by S.; Chanin 2·2 miles N.W.; Bhitari 2·2 miles E.S.E.; and the hamlet of Hasthar 0·9 mile E. by N.

II. Jaliádhār (*Jaliádhār*) Hill Station, lat.  $24^{\circ} 22'$ , long.  $81^{\circ} 27'$ —observed at in 1843—is situated on the summit of a long hill so called which is the highest in that part of the range; pargana Gurha of the Rewah territories.

No description of the construction of the station is forthcoming in the original records, but it may be assumed that it is marked by a structure somewhat similar either to that at Kaimúr or at Dádar. The distances and bearings of surrounding villages are:—Katra 2·7 miles W.N.W.; Mau 2·2 miles S.E.; and Bírpur 1·9 miles S. by E.

III. Dádar Hill Station, lat.  $24^{\circ} 36'$ , long.  $81^{\circ} 15'$ —observed at in 1843—is situated on the summit of a small detached hill about  $1\frac{1}{4}$  miles S. by W. of the village of Dádar; pargana Rewah of the Rewah territories.

The station consists of a platform which has a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Bankunia 0·2 mile E.S.E.; Sakaṛwar 1·4 miles W.; Murárpur or Marha 1·5 miles N.W.; and Banjára about  $1\frac{1}{2}$  miles E.N.E.

IV. Náru Hill Station, lat.  $24^{\circ} 30'$ , long.  $81^{\circ} 0'$ —observed at in 1843—is situated at the north-eastern extremity of a large flat-topped hill called Nárugarh on which there are some tanks and several springs of water, and whose summit is enclosed by a stone wall from 5 to 7 feet in height and 4 feet in thickness: in the Soháwal state.

No description of the construction of the station is forthcoming in the original records, but it may be assumed that it is marked by a structure somewhat similar either to that at Kaimúr or at Dádar. The distances and bearings of surrounding villages are:—Gurhuru 1·1 miles E.; Richari 1·6 miles N.; Kaitha 2·8 miles S.W.; and Beharra 2·2 miles S.S.E.

V. Burwa Hill Station, lat.  $24^{\circ} 33'$ , long.  $81^{\circ} 31'$ —observed at in 1843—is situated on a detached hill about half a mile E. of Burwa: pargana Raipur of the Rewah territories.

The station consists of a pile of stones—the remains of a small Hindu temple—and is marked as usual with a circle and dot. The distances and bearings of surrounding villages are:—Buradi 0·8 mile S.S.W.; Barhái 1·1 miles N.; Gurgaon 2·2 miles E.; and the town of Raipur 2·6 miles N.W.

VI. Kotar Kaimári Hill Station, lat.  $24^{\circ} 43'$ , long.  $81^{\circ} 3'$ —observed at in 1843—is situated on a block named Dongi at the western and highest part of the hill called Kaimári, and is distant somewhat more than 2 miles N.E. of the large village of Kotar: the block itself is held in much veneration in the neighbor-



hood, for tradition affirms that it is the spot from which the father of Rámchandra shot an arrow across a distance of 15 or 16 miles. Pargana Simurria of the Rewah territories.

The station is marked on a large block of laterite being the southern and lower of two blocks which project conspicuously. The distances and bearings of surrounding places are:—Kotar Kaimári hill fort 0·8 mile E. by N.; Bhamaun 1 mile N.; Umri 1 mile W.; and Abair 1·4 miles S.S.E.

VII. Donri (*Doñri*) Hill Station, lat.  $24^{\circ} 54'$ , long.  $81^{\circ} 14'$ —observed at in 1843—is situated on the summit of a hill 1·3 miles N.N.E. of Donri village, and stands on the boundary between the Rewah and Panna territories; pargana Simurria of the Rewah territories.

The station consists of a square platform about 1 foot high, and is marked as usual with a circle and dot. The distances and bearings of surrounding villages are:—Kataik 2·5 miles S.W.; Mainaha 2·3 miles N. by W.; and Barua 1 mile N.N.E.

VIII. Sirmaul (*Sirmaol*) Hill Station, lat.  $24^{\circ} 53'$ , long.  $81^{\circ} 26'$ —observed at in 1843—is situated on the highest part of the hill, and is distant about  $3\frac{1}{4}$  miles N. by E. of the village of Sirmaul: pargana Sirmaul of the Rewah territories.

The station consists of a square platform about 2 feet high which has a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Itma 1·2 miles W.N.W.; Pathera 2·1 miles N. by E.; Luk 2·6 miles N.E.; and Bagha 2 miles S.

IX. Kachár Hill Station, lat.  $24^{\circ} 57'$ , long.  $81^{\circ} 5'$ —observed at in 1843—is situated on the highest part of a hill so called, and is distant about 3 miles from Amua the residence of the Raja of Chaurasi. A stream in a rocky dell is about a mile to the S.E., and at 2 or 3 miles distance there is a waterfall which was formerly used as a place of Hindu pilgrimage: in the Panna state.

The station consists of a square platform about 1 foot high, and is marked as usual with a circle and dot. The distances and bearings of neighboring villages are:—Amama 3·4 miles S. by W.; Chutairi 3·5 miles S.W.; and Kulkaria 4·1 miles S.E.

X. Mau (*Mhao*) Hill Station, lat.  $25^{\circ} 1'$ , long.  $81^{\circ} 18'$ —observed at in 1843—is situated on the highest part of the north-eastern knob of a hill, and is distant about 2 miles N.E. of Mau village: tahsíl Mau, pargana Chhíbu, district Banda.

The station consists of a square platform, and is marked as usual with a circle and dot. The distances and bearings of surrounding villages are:—Gurdari 1·4 miles N.W. by N.; and Uba 2·6 miles S.E.

XI. Lálapur (*Lálápúr*) Hill Station, lat.  $25^{\circ} 14'$ , long.  $81^{\circ} 8'$ —observed at in 1844—is situated on the top of Valmík's *math* (a low temple) on an isolated hill, and is named after the village of Lálapur which lies close to its north-eastern foot: tahsíl Karwi, pargana Tarhawan, district Banda.

The station mark is engraved at 3 inches to the west of the intersection of lines joining the corners of the walls—15 inches high—of the terrace the internal dimensions of which are 8 feet by 7 feet. The distances and bearings of surrounding villages are:—Bagrahi (on the left bank of the Ohan nadi) nearly 0·5 mile W.; Ajaura 0·4 mile N. by E.; Kairi Kutnassa 1 mile E. by N.; and Urwara 1 mile S.S.W.

XII. Bagála Hill Station, lat.  $25^{\circ} 14'$ , long.  $81^{\circ} 39'$ —observed at in 1844—is situated on the highest part of a hill, and is named after the village of Bagála which lies at three quarters of a mile to the N.E.: thána, tahsíl and pargana Bárah, district Allahabad.

The station is marked on the rock *in situ*. The distances and bearings of surrounding villages are:—Unturi 1·1 miles E.S.E.; Londh Kalán 1·4 miles E.N.E.; Burgarh 2·3 miles W.; and Baisa and Shiurájpur 1·2 and 2·3 miles, respectively, S. by E.

XIII. Pabhosa Hill Station, lat.  $25^{\circ} 21'$ , long.  $81^{\circ} 22'$ —observed at in 1844—is situated on the ruins of an old temple at the highest part of a hill, elevated about 300 feet above the level of the Jumna (which flows at  $\frac{1}{4}$  mile to the south) and remarkable from the circumstance of its being the only hill in the Doab; it is named after the village of Pabhosa which is distant 0·4 mile E.S.E.: thána Pachchhim Sará, tahsíl Manjhanpur, pargana Atharban, district Allahabad.

The station is marked on a long block of stone imbedded in the mound. The distances and bearings of surrounding villages are:—Barēhri 1 mile W.; Amind 1·6 miles N. by E.; and Singwal 2·3 miles E. by N.

XIV. Nagdīlpur (*Nagdīlpūr*) Tower Station, lat.  $25^{\circ} 34'$ , long.  $81^{\circ} 12'$ —observed at in 1845—is situated close to the west of the small village of Nagdīlpur: tahsīl Khakhrreru, pargana Ekdala, district Fatehpur.

The station consists of a tower of unburnt bricks 33 feet high—with diameters at top and bottom, respectively, of 17 and 23 feet—enclosing a central hollow pillar of masonry 7 feet in diameter at bottom and 4 feet at top; the whole standing on a basement 31 feet in diameter and 6 feet high, having the central portion (diameter 8 feet) of masonry and carrying a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Kabra 0·4 mile W. by S.; Ratanpur 0·6 mile N.W.; and Bīrsinghpur 1 mile E.S.E.

XV. Singraur (*Singraor*) Tower Station, lat.  $25^{\circ} 35'$ , long.  $81^{\circ} 41'$ —observed at in 1844—stands on the left bank of the Ganges, and is distant 0·6 mile S.S.W. of the village of Singraur: thāna and pargana Nawābganj, tahsīl Soraoon, district Allahabad.

The station consists of a tower of unburnt bricks 32 feet high—with diameters at top and bottom, respectively, of 16 and 23 feet—enclosing a central hollow core of masonry 7 feet in diameter at bottom and 4 feet at top; the whole standing on a basement 32 feet in diameter and 6 feet high, having the central portion (diameter 8 feet) of masonry and carrying a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Jhaupurwa 0·9 mile S.W.; Patna 1·2 miles N.W.; Mansūrabad 1·7 miles E. by N.; and Rāmngar 1·3 miles S.E.

XVI. Karra Tower Station, lat.  $25^{\circ} 42'$ , long.  $81^{\circ} 25'$ —observed at in 1844 and 1845—is situated on the highest part of the old fort of Karra not far from the right bank of the Ganges which is depressed about 135 feet below it: tahsīl Sirāthu, thāna and pargana Karra, district Allahabad.

The station consists of a tower of burnt bricks 27 feet high—with diameters at top and bottom, respectively, of 21 and 27 feet—enclosing a central hollow pillar of masonry 7 feet in diameter at bottom and 4 feet at top; the whole standing on a basement 28 feet in diameter and  $4\frac{1}{2}$  feet high, which carries a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Karra 0·3 mile N.E.; Kamālpur 0·9 mile N.W.; Sultānpur 0·7 mile S.W.; and Akbarpur 1·5 miles E.S.E.

XVII. Majilgaon (*Majilgāōñ*) Tower Station, lat.  $25^{\circ} 45'$ , long.  $81^{\circ} 13'$ —observed at in 1845—is situated on a mound adjoining the western side of the village of Majilgaon and distant about half a mile N. of the Grand Trunk Road: tahsīl Khāga, pargana Hathgaon, district Fatehpur.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which other mark-stones have been fixed in the solid pillar at distances from it of 5, 10, 15, 20 and 25 feet. The distances and bearings of surrounding villages are:—Kathogan 1·9 miles W. by S.; Būdwan 1 mile N. by W.; Kurhaha 1·1 miles E.S.E.; and Purain 2·1 miles S. by E.

XVIII. Pariāon (*Pariāōñ*) Tower Station, lat.  $25^{\circ} 50'$ , long.  $81^{\circ} 25'$ —observed at in 1845—is situated on a mound adjoining the village of Pariāon: thāna and tahsīl Kunda, pargana Mānikpur, district Partabgarh.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which other mark-stones have been fixed in the solid pillar at distances from it of 5, 10, 15, 20 and 25 feet. The distances and bearings of surrounding villages are:—Murussapur 1·2 miles S.S.W.; Gauri 0·8 mile N.W.; Kiraudi 1 mile N. by E.; and Sayyid Yasīmpur 1·4 miles S.E.

XIX. Horesa Tower Station, lat.  $25^{\circ} 55'$ , long.  $81^{\circ} 17'$ —observed at in 1845—is situated on a mound adjoining the western side of the village of Horesa, and is distant about  $1\frac{1}{4}$  miles E. of the left bank of the Ganges: thāna Jagatpur Tāngan, tahsīl, pargana and district Salon.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central hollow pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone to which access was had by means of a small arched passage. The distances and bearings of surrounding villages are:—Madāripur 0·3 mile S.W. by S.; Puchkura 1·1 miles N.N.E.; and Gangauli 0·6 mile S.E. by S.

XX. Salon (*Sálaon*) Tower Station, lat.  $26^{\circ} 2'$ , long.  $81^{\circ} 30'$ —observed at in 1845—is situated near a temple standing on the highest part of the mound on which the town of Salon is built: thána, tahsíl, pargana and district Salon.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which a second mark-stone has been fixed on the summit of the solid pillar. The distances and bearings of surrounding villages are:—Saindhia 1 mile S.W.; Rájapur 1.1 miles N.W. by W.; Sanda Saidun 1.3 miles N.E.; and Aunasudra 1.1 miles E.

XXI. Tánghan (*Tárgan*) Tower Station, lat.  $26^{\circ} 3'$ , long.  $81^{\circ} 19'$ —observed at in 1845—is situated on a mound adjoining the village of Tánghan: thána Jagatpur Tánghan, tahsíl Lalganj, pargana Dalmau, district Rae Bareli.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which other mark-stones have been fixed in the solid pillar at distances from it of 5, 10, 15, 20 and 25 feet. The distances and bearings of surrounding villages are:—Jingna 0.8 mile S.W.; Jagatpur 0.4 mile N.W.; Pura Bijai Kalán 0.8 mile E.; and Bairihar 0.8 mile S.S.E.

XXII. Khára Tower Station, lat.  $26^{\circ} 8'$ , long.  $81^{\circ} 13'$ —observed at in 1845—is situated on a mound about 350 yards N.N.W. of the large village of Khára or Bela Khára: thána Jagatpúr Tánghan, tahsíl, pargana and district Rae Bareli.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which another mark-stone has been fixed in the summit of the solid pillar, others being fixed intermediately. The distances and bearings of surrounding villages are:—Jalálpur 0.4 mile N.W.; Habíb-ka-purwa 1 mile N.E. by E.; and Gaura Umarni 0.9 mile S.W.

XXIII. Munai Tower Station, lat.  $26^{\circ} 11'$ , long.  $81^{\circ} 23'$ —observed at in 1845—is situated on a small mound about 300 yards S. by W. of the village of Munai: thána Mau, tahsíl, pargana and district Rae Bareli. \*

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 16 and 20 feet, and faced with burnt brick—enclosing a central solid pillar of masonry 8 feet square at base and 4 feet diameter at top; the whole standing on a basement 29 feet in diameter and 3 feet high, having at its upper surface a mark-stone in the normal of which other mark-stones have been fixed in the solid pillar at distances from it of 5, 10, 15, 20 and 25 feet. The distances and bearings of surrounding villages are:—Goyindwára 0.6 mile W. by S.; Nathuapur 1 mile E.N.E.; Banihapurwa 1.2 miles S.E.; and Sehi-ka-purwa 0.7 mile S.S.W.

XXIV. Sora Tower Station, lat.  $26^{\circ} 17'$ , long.  $81^{\circ} 15'$ —observed at in 1845—is situated on an elevated mound distant about 500 yards S.S.W. of the village of Sora: thána, tahsíl, pargana and district Rae Bareli.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 16 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Tandu 0.5 mile S.E.; Majhgawan Ráo 1.3 miles W. by N.; Katkan-ka-purwa 0.8 mile N.; and Suranwán 1.4 miles E. by S.

XXV. Janai Tower Station, lat.  $26^{\circ} 22'$ , long.  $81^{\circ} 24'$ —observed at in 1845—is situated on a mound distant 600 yards N.W. by N. of the village of Janai: thána and tahsíl Digbijaiganj, pargana Simrauta, district Rae Bareli.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 14, 20 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Chandapur 1.5 miles W.; Domapur 0.3 mile N.; Maharájpur 1.4 miles E. by S.; and Balipur 1.1 miles S.S.W.

XXVI. Tauli (*Taoli*) Tower Station, lat.  $26^{\circ} 27'$ , long.  $81^{\circ} 15'$ —observed at in 1845—is situated on

high ground distant about half a mile N.W. of the village of Tauli: thána and tahsíl Digbijaiganj, pargana Inhauna, district Rae Bareli.

The station consists of a tower of unburnt bricks 30 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 9, 17, 24 and 30 feet respectively above it. The distances and bearings of surrounding villages are:—Pahnasa 1·3 miles W.S.W.; Unchauri 0·6 mile N. by W.; Puránaganj 1·1 miles E.; and Ghorauna 1·2 miles S.

XXVII. Tikiri Tower Station, lat.  $26^{\circ} 33'$ , long.  $81^{\circ} 25'$ —observed at in 1845—is situated about 350 yards S.S.E. of the ruined village of Tikiri: thána Mohanganj, tahsíl Digbijaiganj, pargana Inhauna, district Rae Bareli.

The station consists of a tower of unburnt bricks 30 feet high—with diameters at top and bottom, respectively, of 12 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 14, 20, 26 and 30 feet respectively above it. The distances and bearings of surrounding villages are:—Rámpur 1·3 miles W.; Sewapur 1·2 miles N.; Jaitpur 1·4 miles E.; and Kadupur 0·8 mile S.S.E.

XXVIII. Parewa Tower Station, lat.  $26^{\circ} 38'$ , long.  $81^{\circ} 15'$ —observed at in 1845—is situated on low ground and is distant nearly 1 mile E. of the village of Parewa: district Bara Banki.

The station consists of a tower of unburnt bricks 30 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 10, 20 and 30 feet respectively above it. The distances and bearings of surrounding villages are:—Dahírapur 0·2 mile N.W.; Khaira Kunku 1·2 miles E. by S.; Sonbaba 0·8 mile S.S.E.; and Khajuria 0·6 mile S.W.

XXIX. Basantpur (*Basantpúr*) Tower Station, lat.  $26^{\circ} 43'$ , long.  $81^{\circ} 25'$ —observed at in 1845—is situated on slightly elevated ground within a couple of hundred yards S.S.W. of the village of Basantpur: thána Zaidpur, tahsíl Haidargarh, pargana Siddhaur, district Bara Banki.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 14, 20 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Dandiya 0·8 mile W.; Simrawan 0·7 mile N.E. by N.; Díh Rámpur 0·7 mile E.S.E.; and Janipur 1 mile S.S.W.

XXX. Pesar Tower Station, lat.  $26^{\circ} 49'$ , long.  $81^{\circ} 15'$ —observed at in 1845—is situated on elevated ground adjoining the village of Pesar, and is distant a few yards from the left bank of the Reth river: thána and tahsíl Nawabganj, pargana Satrikh, district Bara Banki.

The station consists of a tower of unburnt bricks 25 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 16 and 25 feet respectively above it. The distances and bearings of surrounding villages are:—Nagraura 1 mile W.; Gaiaspur 0·5 mile N.N.E.; Sarai Parsanda 0·6 mile S.E.; and Tehri 0·9 mile S.W. by S.

XXXI. Turkani Tower Station, lat.  $26^{\circ} 55'$ , long.  $81^{\circ} 25'$ —observed at in 1845—is situated on high ground immediately west of the village of Turkani, and is distant 0·4 mile from the left bank of the Kalyáni river: thána Nawabganj, tahsíl Rám Sanahi Ghat, pargana Daryabad, district Bara Banki.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 16, 20 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Khidrapur 0·7 mile S.E.; Safdarganj 1·6 miles W.; and Auliapur 1 mile N.

XXXII. Utíámau (*Utlámáo*) Tower Station, lat.  $27^{\circ} 0'$ , long.  $81^{\circ} 15'$ —observed at in 1845—is situated on the ruins of the village of Utíámau, and is considerably elevated above the level of the surrounding plain: thána and tahsíl Nawabganj, pargana Dewa, district Bara Banki.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Shaikhpur 0·5 mile W.; Jíwanpur 0·6 mile N.; Ugeli 0·7 mile E.; and Kumurkha 0·5 mile S.E.

XXXIII. Amoli Tower Station, lat.  $27^{\circ} 6'$ , long.  $81^{\circ} 24'$ —observed at in 1845—is situated in low ground, and is distant 0·7 mile S.W. of the village of Amoli Kalán: thána and pargana Rámnagar, tahsíl Fatehpur, district Bara Banki.

The station consists of a tower of unburnt bricks 30 feet high—with diameters at top and bottom, respectively, of 14 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 8, 14, 20, 26 and 30 feet respectively above it. The distances and bearings of surrounding villages are:—Khilaura 0·6 mile W.; Manaura 1·3 miles N. by W.; Biknapur 0·9 mile E.S.E.; and Thal Khurd 0·5 mile S.

XXXIV. Samnadio (*Samnaddio*) Tower Station, lat.  $27^{\circ} 10'$ , long.  $81^{\circ} 14'$ —observed at in 1845—is situated on ground slightly elevated above the level of the surrounding country, and is at a short distance S.S.E. from the village of Samnadio or Samnadih: thána, tahsíl and pargana Fatehpur, district Bara Banki.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 19 feet—enclosing a central solid pillar of masonry having a mark-stone at base, and others at 8 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Kiratpur 0·2 mile S.W.; Rasulpur 0·7 mile N.; Dasrathpur 0·7 mile S.E.; and the town of Fatehpur 0·9 mile E. by N.

XXXV. Ragaupur (*Ragaopúr*) Tower Station, lat.  $27^{\circ} 18'$ , long.  $81^{\circ} 23'$ —observed at in 1845—is situated in the low-lying lands between the Chauka and Sarju rivers, and is distant about half a mile S.W. of the village of Ragaupur: thána and tahsíl Bári, pargana Kundri, district Sitapur.

The station consists of a tower of unburnt bricks 30 feet high—with diameters at top and bottom, respectively, of 12 and 22 feet—enclosing a central solid pillar of masonry having a mark-stone at base, and others at 8, 24 and 30 feet respectively above it. The distances and bearings of surrounding villages are:—Uchlapur 0·8 mile W.; Burwi Burwa 0·4 mile N.; Majhgawán 0·7 mile E.; and Pura Shiughulám Singh 0·2 mile S.E. by S.

XXXVI. Imlia (*Imlia*) Tower Station, lat.  $27^{\circ} 19'$ , long.  $81^{\circ} 10'$ —observed at in 1845—is situated at the S.W. angle of an old fort in the village of Imlia: tahsíl Bári, thána and pargana Mahmudabad, district Sitapur.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at base, and others at 8 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Ináyatpur 0·7 mile W.; Gobindpur 0·5 mile N.; Khwábipur 0·3 mile E.N.E.; and the town of Mahmudabad 2 miles S. by W.

XXXVII. Thána Tower Station, lat.  $27^{\circ} 28'$ , long.  $81^{\circ} 17'$ —observed at in 1845—is situated on the S.W. bastion of the fort in the village of Thána, and is distant nearly a mile from the right bank of the Gogra river; thána Thánagaon, tahsíl Biswán, pargana Kundri, district Sitapur.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 12 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at base, and others at 8 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Chainpur 1·5 miles S.W. by S.; Wain 1·1 miles N. by W.; Thaura 1·4 miles N.E. by E.; and Dewaria 1·3 miles S.E.

XXXVIII. Ashrafpur (*Ashrafpúr*) Tower Station, lat.  $27^{\circ} 29'$ , long.  $81^{\circ} 4'$ —observed at in 1845—is situated on high ground adjoining the southern side of the village of Ashrafpur: thána, tahsíl and pargana Biswán, district Sitapur.

The station consists of a tower of unburnt bricks 24 feet high—with diameters at top and bottom, respectively, of 14 and 20 feet—enclosing a central solid pillar of masonry having a mark-stone at base, and others at 8 and 24 feet respectively above it. The distances and bearings of surrounding villages are:—Pura Ashrafpur 0·4 mile W.; Ukbapur Khurd 1·3 miles E.N.E.; and Ramanbhari 0·2 mile S.E.

XXXIV.—(*Of the North-East Longitudinal Series*). Khánpur (*Khánpúr*) Tower Station, lat.  $27^{\circ} 39'$ , long.  $81^{\circ} 12'$ —observed at in 1844, 1845 and 1850—is situated in the centre on an old fortress within the village of Khánpur, and its site is elevated about 40 feet above the level of the surrounding country: thána Thánagaon, tahsíl Biswán, pargana Kundri, district Sitapur.

The station consists of an earthen tower 12 feet high—with diameters at top and bottom, respectively, of 13 and 17

feet—enclosing a central solid pillar of masonry having mark-stones at 6 and 12 feet respectively above the base. The station of 1844 was revisited in 1845 at the conclusion of the Karára Meridional Series, and was then apparently found in good preservation. It was again visited in 1850 in the course of the operations of the North-East Longitudinal Series; the mark-stone and pillar having been found intact, it was only necessary to repair the earthen tower. The distances and bearings of surrounding villages are:—Bidaura 1·4 miles S.W.; Mánpur 0·9 mile N.W.; Kunkari 1·5 miles E.; and Maururia Kalán 0·9 mile S. by W.

XXXV.—(*Of the North-East Longitudinal Series*). Mási Tower Station, lat.  $27^{\circ} 38'$ , long.  $81^{\circ} 26'$ —observed at in 1844, 1845 and 1849—is situated in an old fort that stands in the centre of the village of Mási, and its site is elevated about 8 feet above the level of the annual inundation: thána and tahsíl Kurásar, par-gana Fakhrpur, district Bahraich.

The station consists of an earthen tower 24 feet high—with diameters at top and bottom, respectively, of 18 and 40 feet—enclosing a central solid pillar of masonry having mark-stones at 3, 8 and 24 feet respectively above the base. The station of 1844—which had the surrounding tower with diameters at top and bottom, respectively, of 11 and 18 feet—was revisited in 1845 at the conclusion of the Karára Meridional Series, and was then apparently found in good preservation. It was again visited in 1849 in the course of the operations of the North-East Longitudinal Series; the mark-stone at summit and the upper 4 or 5 feet of the central pillar which were then found removed were replaced and the surrounding tower extended to its present dimensions. The distances and bearings of surrounding villages are:—Shukulwa 0·9 mile S.W. by S.; Nasirpur 1·1 miles N.W.; Mansa, across the Sarju river, 1 mile E. by N.; and Bishanpur 0·9 mile S.S.E.

---

NOTE.—In a few instances, the names of principal stations, occurring in the foregoing descriptions, are given by two methods of spelling, distinguished from one another by the use of Roman and Italic type; as in XV. Singraur (*Singraor*): the latter spelling is taken from the Alphabetical and Numerical lists, which precede the descriptions and which were printed in 1869: the spelling in Roman type, is in accordance with the method authorized by the Government and illustrated in lists of Indian proper names published in 1874 and subsequently. It will be seen that the two methods differ but slightly; notwithstanding, where differences exist, both renderings are given, so as to remove all possible doubt as to the identity of a station. The method of spelling authorized by the Government, is hereafter exclusively adopted in the publication of this Series.

July 1877.

J. B. N. HENNESSEY,

*In charge of Computing Office.*

## KARARA MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the preceding descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

| No. of Station | Local name     | District           | Pargana, &c.          | Village in which the Station lies | Remarks on the Condition of the Station                                |
|----------------|----------------|--------------------|-----------------------|-----------------------------------|------------------------------------------------------------------------|
| XXIII          | ...            | Baghelkhand Agency | P. Mádhogarh          | Devardah                          | ...                                                                    |
| XXVI           | ...            | "                  | Marwás, Rewah State   | Marwás                            | ...                                                                    |
| I              | ...            | "                  | P. Gurha, Rewah State | Satar                             | The platform partly washed down, and 3 feet high, as reported in 1873. |
| II             | ...            | "                  | Ditto.                | Tikar                             | ...                                                                    |
| III            | ...            | "                  | Rewah State           | Bankari                           | ...                                                                    |
| IV             | ...            | "                  | Soháwal State         | Durjanpur                         | ...                                                                    |
| V              | ...            | "                  | P. Raepur             | Raepur                            | ...                                                                    |
| VI             | Kotar          | "                  | P. Semaria            | Kotar                             | ...                                                                    |
| VII            | ...            | "                  | Ditto.                | Donri                             | ...                                                                    |
| VIII           | Sirmaur        | "                  | P. Sirmaur            | Sirmaur                           | ...                                                                    |
| IX             | ...            | ...                | ...                   | ...                               | No report received.                                                    |
| X              | Garda-ka-Pahár | Bánda              | P. Chhíbu             | Sesa Sub Karra                    | ...                                                                    |

NOTE.—Stations XXIII and XXVI appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

P. stands for pargana.

| No. of Station | Local name          | District   | Pargana, &c.                                               | Village in which the Station lies | Remarks on the Condition of the Station                                             |
|----------------|---------------------|------------|------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------|
| XI             | ...                 | Bánda      | P. Tarhawan                                                | Lálapur                           | ...                                                                                 |
| XII            | Ghogar Minár        | Allahabad  | Thá. and Tah. Bárah, P. and Táluka Bagála                  | Ghogar                            | No mark found as reported in 1867.                                                  |
| XIII           | ..                  | „          | Tah. Manjhanpur, P. Atharban, Thá. Pachchim Saríra         | Pabhosa                           | Ditto.                                                                              |
| XIV            | Kabra Nagdalpur     | Fatehpur   | Tah. Khakhreru, P. Ekdala                                  | Nagdalpur                         | Upper mark-stone missing as reported in 1867.                                       |
| XV             | ...                 | Allahabad  | Tah. Soraon, P. and Thá. Nawábganj                         | Singraur Khás                     | Considerable portion of the tower washed down by the rain as reported in 1874.      |
| XVI            | Kala Jaichand Minár | „          | Tah. Siráthu, P. and Thá. Karra                            | Sawad Khat alias Karra            | No mark-stone found as reported in 1867.                                            |
| XVII           | ...                 | Fatehpur   | Tah. Khajuha, P. Hathgaon                                  | Majilgaon                         | Upper mark-stone missing as reported in 1867.                                       |
| XVIII          | ...                 | Partabgarh | Tah. Kunda, P. Mánikpur, Thá. Sangrámgarh                  | Pariaun                           | ...                                                                                 |
| XIX            | ...                 | Rae Bareli | Tah. and P. Salon, Thá Jagatpur                            | Horesa                            | ...                                                                                 |
| XX             | Salon               | „          | Tah., P. and Thá. Salon                                    | Salon                             | ...                                                                                 |
| XXI            | Jagatpur Tánghan    | „          | Tah. Lalganj, P. Dalmau, Táluka Shankarpur                 | Tánghan                           | Mark-stone missing, and the pillar only 15 feet high, as reported in 1873 and 1874. |
| XXII           | Bela Khára          | „          | Tah. and P. Rae Bareli, Táluka Khejurgaoon, Thá. Jagatpur  | Khára                             | ...                                                                                 |
| XXIII          | ...                 | „          | Tah., P. and Thá. Rae Bareli                               | Munai                             | ...                                                                                 |
| XXIV           | ...                 | „          | Tah., P. and Thá. Rae Bareli, Táluka Hardaspur             | Sora                              | ...                                                                                 |
| XXV            | ...                 | „          | Tah. and Thá. Digbijai-ganj, P. Simrauta, Táluka Chandapur | Janai                             | ...                                                                                 |
| XXVI           | ...                 | „          | Tah. and Thá. Digbijai-ganj, P. Inhauna, Táluka Thulenda   | Tauli                             | ...                                                                                 |
| XXVII          | Tikri               | „          | Tah. Digbijai-ganj, P. Inhauna, Thá. Mohan-ganj            | Tikri                             | ...                                                                                 |
| XXVIII         | ...                 | ...        | ...                                                        | ...                               | No report received.                                                                 |

NOTE.—P. stands for pargana, Tah. for tahsil, and Thá. for thána.



| No.<br>of Station | Local name     | District   | Pargana, &c.                                                        | Village in which<br>the Station<br>lies | Remarks on the<br>Condition of the Station   |
|-------------------|----------------|------------|---------------------------------------------------------------------|-----------------------------------------|----------------------------------------------|
| XXIX              | ...            | Bara Banki | Tah. Haidargarh, P.<br>Siddhaur, Thá. Zaidpur                       | Basantpur                               | ... ..                                       |
| XXX               | Sarai Parsanda | „          | Tah. and Thá. Nawáb-<br>ganj, P. Satrikh                            | Sarai Parsanda                          | Entirely fallen down as reported in<br>1877. |
| XXXI              | ...            | „          | Tah. Rám Sanehi Ghát,<br>P. Daryabad, Thá. Na-<br>wábganj           | Turkani                                 | ... ..                                       |
| XXXII             | Jianpur        | „          | Tah. Nawábganj, P.<br>Dewa, Thá. Kursi                              | Jianpur                                 | ... ..                                       |
| XXXIII            | ...            | „          | Tah. Fatehpur, P. and<br>Thá. Rámnagar                              | Amoli                                   | ... ..                                       |
| XXXIV             | Samnadih       | „          | Tah., P. and Thá. Fateh-<br>pur                                     | Samnadih                                | ... ..                                       |
| XXXV              | ...            | Sitapur    | Tah. Bári, P. Kundri,<br>Táluka Rámpur Mathu-<br>ra, Thá. Thánagaon | Raghuapur                               | ... ..                                       |
| XXXVI             | ...            | „          | Tah. Bári, P. Mahmud-<br>abad                                       | Imlia                                   | ... ..                                       |
| XXXVII            | ...            | „          | Tah. Biswán, P. Kundri,<br>Thá. Thánagaon                           | Thánagaon                               | ... ..                                       |
| XXXVIII           | ...            | „          | Tah. and P. Biswán                                                  | Ashrafpur                               | ... ..                                       |
| XXXIV†            | ...            | „          | Tah. Biswán, P. Kundri,<br>Thá. Tambaur                             | Khánpur                                 | ... ..                                       |
| XXXV†             | ...            | Bahraich   | P. Fakhrpur, Thá. Sisía,<br>Tah. Kurásar                            | Masi                                    | ... ..                                       |

NOTE.—Stations XXXIV† and XXXV† appertain to the North-East Longitudinal Series.

P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

September, 1882.

J. B. N. HENNESSEY,  
In charge of Computing Office.



## KARARA MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. TRIANGLES.

| No. of Triangle | Station       | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|---------------|------------------|-----------------------|-----------|----------|--------|
|                 |               |                  |                       | Log. feet | Feet     | Miles  |
| 1               | Karára, XXIII | 1'44             | 65 38 42'27           | 5'2116206 | 162787'3 | 30'831 |
|                 | Marwás, XXVI  | 1'44             | 40 57 7'58            | 5'0686232 | 117117'9 | 22'181 |
|                 | Jaliádhar, II | 1'44             | 73 24 10'15           | 5'2336163 | 171244'4 | 32'433 |
| 2               | Karára, XXIII | '58              | 49 8 29'30            | 4'9483767 | 88792'6  | 16'817 |
|                 | Jaliádhar, II | '58              | 44 49 45'61           | 4'9178545 | 82766'5  | 15'676 |
|                 | Kaimúr, I     | '58              | 86 1 45'09            | 5'0686232 | 117117'9 | 22'181 |
| 3               | Karára, XXIII | 1'02             | 114 47 12'57          | 5'3408876 | 219223'7 | 41'520 |
|                 | Marwás, XXVI  | 1'01             | 20 2 42'82            | 4'9178545 | 82766'5  | 15'675 |
|                 | Kaimúr, I     | 1'02             | 45 10 4'61            | 5'2336163 | 171244'4 | 32'433 |
| 4               | Kaimúr, I     | '71              | 60 27 41'51           | 5'0281552 | 106697'7 | 20'208 |
|                 | Jaliádhar, II | '72              | 73 9 2'57             | 5'0695674 | 117372'8 | 22'230 |
|                 | Dádar, III    | '71              | 46 23 15'92           | 4'9483767 | 88792'6  | 16'817 |
| 5               | Jaliádhar, II | '51              | 59 23 7'51            | 4'9694424 | 93205'7  | 17'653 |
|                 | Dádar, III    | '51              | 40 29 14'56           | 4'8470672 | 70318'1  | 13'318 |
|                 | Burwa, V      | '51              | 80 7 37'93            | 5'0281552 | 106697'7 | 20'208 |

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Stations Karára, XXIII, and Marwás, XXVI, appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

| No. of Triangle | Station           | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|-------------------|------------------|-----------------------|-----------|----------|--------|
|                 |                   |                  |                       | Log. feet | Feet     | Miles  |
| 6               | Dádar, III        | "                | "                     |           |          |        |
|                 | Burwa, V          | .83              | 69 37 0.63            | 5.0923326 | 123689.4 | 23.426 |
|                 | Sirmaul, VIII     | .83              | 65 26 36.42           | 5.0792423 | 120016.9 | 22.730 |
| 7               | Dádar, III        | .82              | 44 56 22.95           | 4.9694424 | 93205.7  | 17.653 |
|                 | Sirmaul, VIII     | .57              | 34 29 57.49           | 4.8357662 | 68511.9  | 12.976 |
|                 | Donri, VII        | .58              | 62 39 52.49           | 5.0312219 | 107453.8 | 20.351 |
| 8               | Donri, VII        | .58              | 82 50 10.02           | 5.0792423 | 120016.9 | 22.730 |
|                 | Sirmaul, VIII     | .23              | 63 21 37.03           | 4.8034301 | 63596.0  | 12.045 |
|                 | Mau, X            | .23              | 42 17 16.08           | 4.6800900 | 47872.9  | 9.067  |
| 9               | Mau, X            | .23              | 74 21 6.89            | 4.8357662 | 68511.9  | 12.976 |
|                 | Bagála, XII       | .70              | 72 57 3.20            | 5.1508909 | 141543.8 | 26.808 |
|                 | Bagála, XII       | .71              | 81 36 34.62           | 5.1657352 | 146465.4 | 27.740 |
| 10              | Mau, X            | .70              | 25 26 22.18           | 4.8034301 | 63596.0  | 12.045 |
|                 | Bagála, XII       | 1.01             | 46 21 47.52           | 5.0263431 | 106253.5 | 20.124 |
|                 | Pabhosa, XIII     | 1.02             | 59 2 6.20             | 5.099924  | 125890.3 | 23.843 |
| 11              | Bagála, XII       | 1.02             | 74 36 6.28            | 5.1508909 | 141543.8 | 26.808 |
|                 | Pabhosa, XIII     | 1.01             | 70 46 50.34           | 5.1341807 | 136201.1 | 25.796 |
|                 | Singraur, XV      | 1.01             | 61 46 23.53           | 5.1041031 | 127087.6 | 24.070 |
| 12              | Pabhosa, XIII     | 1.00             | 47 26 46.13           | 5.0263431 | 106253.5 | 20.124 |
|                 | Singraur, XV      | .95              | 44 31 54.37           | 4.9994105 | 99864.4  | 18.914 |
|                 | Karra, XVI        | .95              | 62 26 0.42            | 5.1011698 | 126232.1 | 23.908 |
| 13              | Pabhosa, XIII     | .96              | 73 2 5.21             | 5.1341807 | 136201.1 | 25.796 |
|                 | Karra, XVI        | .63              | 41 43 52.48           | 4.9244303 | 84029.2  | 15.915 |
|                 | Nagdilpur, XIV    | .63              | 48 51 19.13           | 4.9780166 | 95064.1  | 18.005 |
| 14              | Kaimár, I         | .63              | 89 24 48.39           | 5.1011698 | 126232.1 | 23.908 |
|                 | Dádar, III        | .70              | 48 42 37.89           | 4.9600983 | 91221.7  | 17.277 |
|                 | Náru, IV          | .70              | 56 5 49.73            | 5.0033057 | 100764.1 | 19.084 |
| 15              | Dádar, III        | .70              | 75 11 32.38           | 5.0695674 | 117372.8 | 22.230 |
|                 | Náru, IV          | .49              | 59 4 34.03            | 4.9266980 | 84469.1  | 15.998 |
|                 | Kotar Kaimári, VI | .48              | 53 2 20.68            | 4.8958580 | 78678.9  | 14.901 |
| 16              | Dádar, III        | .49              | 67 53 5.29            | 4.9600983 | 91221.7  | 17.277 |
|                 | Kotar Kaimári, VI | .54              | 53 50 3.29            | 4.9448882 | 88082.2  | 16.682 |
|                 | Donri, VII        | .54              | 80 1 5.32             | 5.0312219 | 107453.8 | 20.351 |
| 17              | Kotar Kaimári, VI | .54              | 46 8 51.39            | 4.8958580 | 78678.9  | 14.901 |
|                 | Donri, VII        | .31              | 33 39 38.15           | 4.6957877 | 49635.0  | 9.401  |
|                 | Kachár, IX        | .31              | 66 43 36.14           | 4.9152056 | 82263.2  | 15.580 |
| 18              | Donri, VII        | .32              | 79 36 45.71           | 4.9448882 | 88082.2  | 16.682 |
|                 | Kachár, IX        | .19              | 100 55 43.57          | 4.8762715 | 75209.3  | 14.244 |
|                 | Mau, X            | .18              | 38 40 51.98           | 4.6800900 | 47872.9  | 9.067  |
| 19              | Kachár, IX        | .18              | 40 23 24.45           | 4.6957877 | 49635.0  | 9.401  |
|                 | Mau, X            | .56              | 62 1 41.92            | 4.9913512 | 98028.2  | 18.566 |
|                 | Lálapur, XI       | .57              | 75 18 56.91           | 5.0308803 | 107369.3 | 20.335 |
| 20              | Mau, X            | .56              | 42 39 21.17           | 4.8762715 | 75209.3  | 14.244 |
|                 | Lálapur, XI       | .65              | 41 58 6.26            | 4.9258369 | 84301.8  | 15.966 |
|                 | Pabhosa, XIII     | .65              | 86 59 23.21           | 5.099924  | 125890.3 | 23.843 |
|                 |                   | .65              | 51 2 30.53            | 4.9913512 | 98028.2  | 18.566 |

PRINCIPAL TRIANGULATION. TRIANGLES.

13—M.

| No. of Triangle | Station         | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|-----------------|------------------|-----------------------|-----------|----------|--------|
|                 |                 |                  |                       | Log. feet | Feet     | Miles  |
| 21              | Lálapur, XI     | '63              | 50 30 6'20            | 4'9780166 | 95064'1  | 18'005 |
|                 | Pabhosa, XIII   | '63              | 86 19 7'92            | 5'0897028 | 122942'7 | 23'285 |
|                 | Nagdílpur, XIV  | '63              | 43 10 45'88           | 4'9258369 | 84301'8  | 15'966 |
| 22              | Nagdílpur, XIV  | '34              | 49 48 44'38           | 4'8157810 | 65430'6  | 12'392 |
|                 | Karra, XVI      | '34              | 51 20 59'97           | 4'8253621 | 66890'1  | 12'669 |
|                 | Majilgaon, XVII | '34              | 78 50 15'65           | 4'9244303 | 84029'2  | 15'915 |
| 23              | Karra, XVI      | '24              | 72 37 7'04            | 4'8399938 | 69182'1  | 13'103 |
|                 | Majilgaon, XVII | '24              | 42 52 51'99           | 4'6931066 | 49329'5  | 9'343  |
|                 | Pariáon, XVIII  | '24              | 64 30 0'97            | 4'8157810 | 65430'6  | 12'392 |
| 24              | Majilgaon, XVII | '25              | 45 17 14'52           | 4'7148617 | 51863'5  | 9'823  |
|                 | Pariáon, XVIII  | '25              | 63 16 49'45           | 4'8141667 | 65187'9  | 12'346 |
|                 | Horesa, XIX     | '25              | 71 25 56'03           | 4'8399938 | 69182'1  | 13'103 |
| 25              | Pariáon, XVIII  | '30              | 72 58 35'50           | 4'8933819 | 78231'5  | 14'817 |
|                 | Horesa, XIX     | '29              | 67 41 5'71            | 4'8790333 | 75689'1  | 14'335 |
|                 | Salon, XX       | '29              | 39 20 18'79           | 4'7148617 | 51863'5  | 9'823  |
| 26              | Horesa, XIX     | '21              | 47 45 56'23           | 4'7652079 | 58238'2  | 11'030 |
|                 | Salon, XX       | '21              | 36 16 6'58            | 4'6677467 | 46531'5  | 8'813  |
|                 | Táughan, XXI    | '21              | 95 57 57'19           | 4'8933819 | 78231'5  | 14'817 |
| 27              | Salon, XX       | '23              | 49 54 22'19           | 4'7235360 | 52909'8  | 10'021 |
|                 | Táughan, XXI    | '23              | 72 44 19'12           | 4'8198656 | 66048'9  | 12'509 |
|                 | Munai, XXIII    | '23              | 57 21 18'09           | 4'7652079 | 58238'2  | 11'030 |
| 28              | Táughan, XXI    | '18              | 72 35 36'54           | 4'7611466 | 57696'1  | 10'927 |
|                 | Munai, XXIII    | '17              | 46 21 21'25           | 4'6410274 | 43755'0  | 8'287  |
|                 | Khára, XXII     | '17              | 61 3 2'21             | 4'7235360 | 52909'8  | 10'021 |
| 29              | Horesa, XIX     | '14              | 29 36 18'61           | 4'6410274 | 43755'0  | 8'287  |
|                 | Táughan, XXI    | '14              | 118 42 6'39           | 4'8903472 | 77686'8  | 14'713 |
|                 | Khára, XXII     | '14              | 31 41 35'00           | 4'6677467 | 46531'5  | 8'813  |
| 30              | Khára, XXII     | '24              | 61 32 16'38           | 4'7767393 | 59805'3  | 11'327 |
|                 | Munai, XXIII    | '24              | 60 27 12'40           | 4'7721819 | 59181'0  | 11'209 |
|                 | Sora, XXIV      | '23              | 58 0 31'22            | 4'7611466 | 57696'1  | 10'927 |
| 31              | Munai, XXIII    | '25              | 53 0 31'77            | 4'7612666 | 57712'1  | 10'930 |
|                 | Sora, XXIV      | '26              | 71 7 41'60            | 4'8348711 | 68370'9  | 12'949 |
|                 | Janai, XXV      | '26              | 55 51 46'63           | 4'7767393 | 59805'3  | 11'327 |
| 32              | Sora, XXIV      | '23              | 57 2 58'55            | 4'7524861 | 56557'0  | 10'712 |
|                 | Janai, XXV      | '23              | 64 2 56'30            | 4'7824918 | 60602'7  | 11'478 |
|                 | Tauli, XXVI     | '23              | 58 54 5'15            | 4'7612666 | 57712'1  | 10'930 |
| 33              | Janai, XXV      | '25              | 61 16 49'47           | 4'7926892 | 62042'5  | 11'750 |
|                 | Tauli, XXVI     | '25              | 65 38 33'52           | 4'8092126 | 64448'5  | 12'206 |
|                 | Tikiri, XXVII   | '25              | 53 4 37'01            | 4'7524861 | 56557'0  | 10'712 |
| 34              | Tauli, XXVI     | '28              | 61 33 8'06            | 4'8143637 | 65217'4  | 12'352 |
|                 | Tikiri, XXVII   | '28              | 61 40 51'16           | 4'8148905 | 65296'6  | 12'367 |
|                 | Parewa, XXVIII  | '28              | 56 46 0'78            | 4'7926892 | 62042'5  | 11'750 |
| 35              | Tikiri, XXVII   | '28              | 59 44 27'48           | 4'8124049 | 64923'9  | 12'296 |
|                 | Parewa, XXVIII  | '29              | 60 4 15'97            | 4'8138551 | 65141'1  | 12'337 |
|                 | Basantpur, XXIX | '29              | 60 11 16'55           | 4'8143637 | 65217'4  | 12'352 |

## KARARA MERIDIONAL SERIES.

| No. of Triangle | Station            | Spherical Excess | Corrected Plane Angle | Distance  |         |        |
|-----------------|--------------------|------------------|-----------------------|-----------|---------|--------|
|                 |                    |                  |                       | Log. feet | Feet    | Miles  |
| 36              | Parewa, XXVIII     | 28               | 59 1 27'65            | 4'8062389 | 64008'7 | 12'123 |
|                 | Basantpur, XXIX    | 29               | 60 33 29'37           | 4'8130084 | 65014'2 | 12'313 |
|                 | Pesar, XXX         | 28               | 60 25 2'98            | 4'8124049 | 64923'9 | 12'296 |
| 37              | Basantpur, XXIX    | 30               | 61 27 2'94            | 4'8323947 | 67982'1 | 12'875 |
|                 | Pesar, XXX         | 31               | 62 45 2'40            | 4'8376115 | 68803'7 | 13'031 |
|                 | Turkani, XXXI      | 30               | 55 47 54'66           | 4'8062389 | 64008'7 | 12'123 |
| 38              | Pesar, XXX         | 30               | 57 44 57'23           | 4'8159682 | 65458'8 | 12'398 |
|                 | Turkani, XXXI      | 30               | 60 48 36'91           | 4'8297601 | 67571'0 | 12'798 |
|                 | Utiámau, XXXII     | 31               | 61 26 25'86           | 4'8323947 | 67982'1 | 12'875 |
| 39              | Turkani, XXXI      | 27               | 54 22 24'81           | 4'7797749 | 60224'7 | 11'406 |
|                 | Utiámau, XXXII     | 28               | 63 33 43'35           | 4'8217994 | 66343'7 | 12'565 |
|                 | Amoli, XXXIII      | 28               | 62 3 51'84            | 4'8159682 | 65458'8 | 12'398 |
| 40              | Utiámau, XXXII     | 24               | 58 20 42'58           | 4'7742597 | 59464'8 | 11'262 |
|                 | Amoli, XXXIII      | 25               | 62 6 4'43             | 4'7905574 | 61738'7 | 11'693 |
|                 | Samnadio, XXXIV    | 25               | 59 33 12'99           | 4'7797749 | 60224'7 | 11'406 |
| 41              | Amoli, XXXIII      | 30               | 60 4 53'91            | 4'8289775 | 67449'3 | 12'774 |
|                 | Samnadio, XXXIV    | 30               | 70 5 18'08            | 4'8643192 | 73167'7 | 13'858 |
|                 | Ragaupur, XXXV     | 29               | 49 49 48'01           | 4'7742597 | 59464'8 | 11'262 |
| 42              | Samnadio, XXXIV    | 30               | 67 49 20'70           | 4'8525750 | 71215'6 | 13'488 |
|                 | Ragaupur, XXXV     | 29               | 50 53 22'59           | 4'7757791 | 59673'2 | 11'302 |
|                 | Imlia, XXXVI       | 29               | 61 17 16'71           | 4'8289775 | 67449'3 | 12'774 |
| 43              | Ragaupur, XXXV     | 33               | 55 37 48'60           | 4'8257795 | 66954'5 | 12'681 |
|                 | Imlia, XXXVI       | 34               | 62 58 29'18           | 4'8588927 | 72259'1 | 13'685 |
|                 | Thána, XXXVII      | 34               | 61 23 42'22           | 4'8525750 | 71215'6 | 13'488 |
| 44              | Imlia, XXXVI       | 33               | 62 10 56'86           | 4'8472530 | 70348'2 | 13'324 |
|                 | Thána, XXXVII      | 32               | 60 29 23'75           | 4'8402391 | 69221'2 | 13'110 |
|                 | Ashrafpur, XXXVIII | 32               | 57 19 39'39           | 4'8257795 | 66954'5 | 12'681 |
| 45              | Thána, XXXVII      | 35               | 60 53 53'13           | 4'8529845 | 71282'8 | 13'501 |
|                 | Ashrafpur, XXXVIII | 34               | 59 31 33'79           | 4'8470310 | 70312'3 | 13'317 |
|                 | Khánpur, XXXIV     | 34               | 59 34 33'08           | 4'8472530 | 70348'2 | 13'324 |
| 46              | Thána, XXXVII      | 37               | 60 51 46'80           | 4'8709065 | 74285'9 | 14'069 |
|                 | Khánpur, XXXIV     | 37               | 63 22 19'75           | 4'8809710 | 76027'6 | 14'399 |
|                 | Mási, XXXV         | 37               | 55 45 53'45           | 4'8470310 | 70312'3 | 13'317 |

NOTE.—Stations Khánpur, XXXIV, and Mási, XXXV, appertain to the North-East Longitudinal Series.

November 1878.

J. B. N. HENNESSEY,

In charge of Computing Office.

# KARARA MERIDIONAL SERIES.

## SECONDARY TRIANGULATION. TRIANGLES.

### PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

| No. of Triangle | Station                      | Corrected Plane Angle | Distance  |        |        | No. of Triangle | Station                       | Corrected Plane Angle | Distance  |        |        | Theodolite used |
|-----------------|------------------------------|-----------------------|-----------|--------|--------|-----------------|-------------------------------|-----------------------|-----------|--------|--------|-----------------|
|                 |                              |                       | Log. feet | Feet   | Miles  |                 |                               |                       | Log. feet | Feet   | Miles  |                 |
| 47              | Karara, XXIII                | 45 21 14              | 5.234039  | 171411 | 32.464 | 52              | Jaliadhar, II                 | 48 26 35              | 5.001658  | 100382 | 19.012 | Inch 18         |
|                 | Jaliadhar, II                | 105 33 39             | 5.365670  | 232097 | 43.958 |                 | Burwa, V                      | 99 56 37              | 5.121010  | 132133 | 25.025 | "               |
|                 | Pabei                        | 29 5 7                | 5.068623  | 117118 | 22.181 |                 | Gurwa Parur                   | 31 36 48              | 4.847067  | 70318  | 13.318 | "               |
| 48              | Marwas, XXVI                 | 79 2 13               | 5.234039  | 171411 | 32.464 | 53              | Dadar, III                    | 35 57 26              | 4.790693  | 61758  | 11.697 | "               |
|                 | Jaliadhar, II                | 32 9 27               | 4.968152  | 92929  | 17.600 |                 | Burwa, V                      | 26 26 23              | 4.670531  | 46831  | 8.869  | "               |
|                 | Pabei                        | 68 48 20              | 5.211621  | 162787 | 30.831 |                 | Rewah Diwan's Temple          |                       | 4.969442  | 93206  | 17.653 | "               |
| 49              | Dadar, III                   | 68 26 33              | 4.950061  | 80323  | 16.917 | 54              | Dadar, III                    | 34 1 12               | 4.799745  | 63059  | 11.943 | "               |
|                 | Kotar Kaimari, VI            | 56 33 1               | 4.903814  | 80133  | 15.177 |                 | Burwa, V                      | 21 46 3               | 4.621147  | 41797  | 7.916  | "               |
|                 | Andhi Hill Mark (heliotrope) |                       | 4.893858  | 78679  | 14.901 |                 | Rewah Large Temple            |                       | 4.969442  | 93206  | 17.653 | "               |
| 50              | Kaimur, I                    | 43 3 24               | 4.903814  | 80133  | 15.177 | 55              | Kotar Kaimari, VI             | 60 10 29              | 4.886118  | 76934  | 14.571 | "               |
|                 | Dadar, III                   | 46 43 52              | 4.931788  | 83465  | 16.187 |                 | Donri, VII                    | 36 28 52              | 4.722019  | 52725  | 9.986  | "               |
|                 | Andhi Hill Mark (heliotrope) |                       | 5.069567  | 117373 | 22.230 |                 | Haraha Hill Mark (heliotrope) |                       | 4.944888  | 88682  | 16.682 | "               |
| 51              | Burwa, V                     | 114 29 7              | 5.276138  | 188859 | 35.769 | 56              | Donri, VII                    | 30 14 44              | 4.625801  | 42247  | 8.001  | "               |
|                 | Sirmaul, VIII                | 28 55 43              | 5.001658  | 100382 | 19.012 |                 | Kachar, IX                    | 113 28 14             | 4.886118  | 76934  | 14.571 | "               |
|                 | Gurwa Parur                  | 36 35 10              | 5.092333  | 123689 | 23.426 |                 | Haraha Hill Mark (heliotrope) |                       | 4.695788  | 49635  | 9.401  | "               |

NOTES.—1. Names followed by Roman numerals are those of Principal Stations. Stations Karara, XXIII, and Marwas, XXVI appertain to the Calcutta Longitudinal Series of the South-East Quadl.  
2. The values of the side are given in the same line with the opposite angle.

## KARARA MERIDIONAL SERIES.

| Triangle No. | Station                                                         | Corrected Plane Angle           | Distance                         |                            |                            | No. of Triangle | Station                                                          | Corrected Plane Angle            | Distance                         |                           |                            | Theodolite used |
|--------------|-----------------------------------------------------------------|---------------------------------|----------------------------------|----------------------------|----------------------------|-----------------|------------------------------------------------------------------|----------------------------------|----------------------------------|---------------------------|----------------------------|-----------------|
|              |                                                                 |                                 | Log. feet                        | Feet                       | Miles                      |                 |                                                                  |                                  | Log. feet                        | Feet                      | Miles                      |                 |
| 57           | Dádar, III<br>Donri, VII<br>Pati Hill Mark (heliotrope)         | 15 8 0<br>78 45 26              | 4.448975<br>5.023809<br>5.031222 | 28117<br>105635<br>107454  | 5.325<br>20.007<br>20.351  | 69              | Bagála, XII<br>Singraur, XV<br>Allahabad Church                  | 40 12 23<br>63 5 26              | 4.925830<br>5.066135<br>5.104103 | 84300<br>116449<br>127088 | 15.966<br>22.055<br>24.070 | Inch<br>18<br>" |
| 58           | Dádar, III<br>Kotar Kaimázi, VI<br>Pati Hill Mark (heliotrope)  | 38 42 4<br>93 15 32             | 4.820571<br>5.023809<br>4.805858 | 66156<br>105635<br>78679   | 12.530<br>20.007<br>14.901 | 70              | Bagála, XII<br>Allahabad Fort<br>Allahabad Church                | 5 33 38<br>107 56 2              | 4.074079<br>5.066135<br>5.050182 | 11860<br>116449<br>112249 | 2.246<br>22.055<br>21.259  | "<br>"<br>"     |
| 59           | Sirmaul, VIII<br>Bagála, XII<br>Raghumáthpur Hill Mark (helio.) | 39 42 31<br>18 27 12            | 5.041972<br>4.736968<br>5.165735 | 110147<br>54572<br>146465  | 20.861<br>10.336<br>27.740 | 71              | Allahabad Fort<br>Allahabad Church<br>Allahabad                  | 26 13 0<br>98 37 58              | 3.724221<br>3.993189<br>4.074079 | 5299<br>9844<br>11860     | 1.004<br>1.864<br>2.246    | "<br>"<br>"     |
| 60           | Mau, X<br>Bagála, XII<br>Raghumáthpur Hill Mark (helio.)        | 50 51 6<br>43 53 35             | 5.041972<br>4.993312<br>5.150891 | 110147<br>98472<br>141544  | 20.861<br>18.650<br>26.808 | 72              | Allahabad Church<br>Allahabad<br>Jhúsi                           | 84 42 30<br>17 0 15              | 4.249044<br>4.256327<br>3.724221 | 17744<br>18044<br>5299    | 3.361<br>3.417<br>1.004    | "<br>"<br>"     |
| 61           | Sirmaul, VIII<br>Mau, X<br>Chaukandi Hill Mark                  | 43 43 5<br>44 19 23             | 4.643231<br>4.647977<br>4.803430 | 43978<br>44461<br>63596    | 8.329<br>8.421<br>12.045   | 73              | Allahabad Fort<br>Allahabad Church<br>Allahabad House No. 4      | 17 41 27<br>101 46 41            | 3.566024<br>4.023151<br>4.074079 | 3681<br>10548<br>11860    | 0.697<br>1.998<br>2.246    | "<br>"<br>"     |
| 62           | Bagála, XII<br>Pabhosa, XIII<br>Kohi Hill Mark (heliotrope)     | 27 24 19<br>129 56 54           | 5.103858<br>5.325417<br>5.026343 | 127016<br>211552<br>106253 | 24.056<br>40.067<br>20.124 | 74              | Allahabad Fort<br>Allahabad<br>Allahabad House No. 4             | 8 31 33<br>110 33 43<br>60 54 44 | 3.222749<br>4.023151<br>3.993189 | 1670<br>10548<br>9844     | 0.316<br>1.998<br>1.864    | "<br>"<br>"     |
| 63           | Pabhosa, XIII<br>Nagápur, XIV<br>Kohi Hill Mark (heliotrope)    | 82 0 53<br>58 23 17             | 5.169382<br>5.103858<br>4.978017 | 147701<br>127016<br>95064  | 27.974<br>24.056<br>18.005 | 75              | Allahabad Fort<br>Allahabad House No. 4<br>Allahabad Juma Masjid | 59 16 23<br>13 8 36              | 3.978234<br>3.400699<br>4.023151 | 9511<br>2516<br>10548     | 1.801<br>0.477<br>1.998    | "<br>"<br>"     |
| 64           | Kachár, IX<br>Mau, X<br>Bhauri Hill Mark (heliotrope)           | 68 8 27<br>68 31 19             | 5.007359<br>5.008507<br>4.876271 | 101709<br>101978<br>75209  | 19.263<br>19.314<br>14.244 | 76              | Allahabad Fort<br>Allahabad<br>Allahabad Fort Flagstaff          | 113 22 50<br>7 56 14             | 4.024370<br>3.201736<br>3.993189 | 10577<br>1591<br>9844     | 2.003<br>0.301<br>1.864    | "<br>"<br>"     |
| 65           | Mau, X<br>Pabhosa, XIII<br>Bhauri Hill Mark (heliotrope)        | 48 45 45<br>52 25 32            | 4.984534<br>5.007359<br>5.099992 | 96501<br>101709<br>125890  | 18.277<br>19.263<br>23.843 | 77              | Allahabad Fort<br>Jhúsi<br>Allahabad Fort Flagstaff              | 36 33 35<br>7 27 8               | 3.863796<br>3.201736<br>3.930663 | 7308<br>1591<br>8524      | 1.384<br>0.301<br>1.614    | "<br>"<br>"     |
| 66           | Mau, X<br>Bagála, XII<br>Chandaha Hill Mark (heliotrope)        | 12 46 0<br>40 54 34             | 4.589083<br>5.060879<br>5.150891 | 38822<br>115048<br>141544  | 7.353<br>21.789<br>26.808  | 78              | Allahabad Fort<br>Allahabad<br>Allahabad Temple No. 2            | 7 18 18<br>124 3 37              | 3.222152<br>4.036097<br>3.993189 | 1668<br>10867<br>9844     | 0.316<br>2.058<br>1.864    | "<br>"<br>"     |
| 67           | Mau, X<br>Pabhosa, XIII<br>Chandaha Hill Mark (heliotrope)      | 33 35 49<br>64 43 24            | 4.847585<br>5.060879<br>5.099992 | 70402<br>115048<br>125890  | 13.334<br>21.789<br>23.843 | 79              | Allahabad Fort<br>Jhúsi<br>Allahabad Temple No. 1                | 81 49 12<br>53 30 13             | 4.079203<br>3.988843<br>3.930663 | 12001<br>9746<br>8524     | 2.273<br>1.846<br>1.614    | "<br>"<br>"     |
| 68           | Bagála, XII<br>Singraur, XV<br>Allahabad Fort                   | 45 46 1<br>58 45 36<br>75 28 23 | ALLAHABAD<br>SECONDARY SERIES.†  |                            |                            | 80              | Allahabad Fort<br>Allahabad<br>Allahabad Temple No. 1            | 68 7 13<br>55 30 57              | 4.040300<br>3.988843<br>3.993189 | 10972<br>9746<br>9844     | 2.078<br>1.846<br>1.864    | "<br>"<br>"     |
|              |                                                                 |                                 |                                  |                            |                            | 81              | Allahabad Fort<br>Allahabad Church<br>Badra                      | 74 31 23<br>43 12 49             | 4.222525<br>4.185556<br>4.074079 | 16693<br>15331<br>11860   | 3.161<br>2.904<br>2.246    | "<br>"<br>"     |
|              |                                                                 |                                 |                                  |                            |                            |                 |                                                                  |                                  |                                  |                           |                            |                 |

† Instrument not known. † For the continuation of this triangulation see triangles No. 187 and following in the Synopsis of the Results of the Gurwani Meridional Series.



## SECONDARY TRIANGULATION. TRIANGLES.

17—M.

| No. of Triangle | Station                                                        | Corrected Plane Angle            | Distance                            |                         |                           | Theodolite used     | No. of Triangle | Station                                             | Corrected Plane Angle            | Distance                            |                          |                            | Theodolite used |
|-----------------|----------------------------------------------------------------|----------------------------------|-------------------------------------|-------------------------|---------------------------|---------------------|-----------------|-----------------------------------------------------|----------------------------------|-------------------------------------|--------------------------|----------------------------|-----------------|
|                 |                                                                |                                  | Log. feet                           | Feet                    | Miles                     |                     |                 |                                                     |                                  | Log. feet                           | Feet                     | Miles                      |                 |
| 82              | Allahabad Fort<br>Badra<br>Jhúsi                               | 49 12 2<br>33 28 11<br>97 19 47  | 4°06'217<br>3°93'0663<br>4°18'5556  | 11701<br>8524<br>15331  | 2°216<br>1°614<br>2°904   | Inch<br>*<br>*<br>* | 95              | Allahabad Fort<br>Jhúsi<br>Allahabad Burial Ground  | 162 25 15<br>6 34 28             | 4°12'9920<br>3°70'8663<br>3°93'0603 | 13487<br>5113<br>8524    | 2°554<br>0°968<br>1°614    | "               |
| 83              | Allahabad Fort<br>Allahabad Church<br>Jhúsi                    | 123 43 25<br>33 8 22             | 4°25'6327<br>3°93'0663<br>4°07'4079 | 18044<br>8524<br>11860  | 3°417<br>1°614<br>2°246   | *<br>*<br>*         | 96              | Bagála, XII<br>Allahabad Church<br>Bhíta            | 21 50 4<br>133 0 44              | 4°77'2550<br>4°83'0526<br>5°06'6135 | 59231<br>67690<br>116449 | 11°218<br>12°820<br>22°055 | 12              |
| 84              | Allahabad Fort<br>Jhúsi<br>Allahabad No. 2                     | 76 38 36<br>58 25 28<br>44 55 56 | 4°06'9783<br>4°01'2106<br>3°93'0663 | 11743<br>10283<br>8524  | 2°224<br>1°948<br>1°614   | *<br>*<br>*         | 97              | Bagála, XII<br>Bhíta<br>Balaun Hill Mark            | 59 47 41<br>29 4 14              | 4°76'7240<br>4°51'7146<br>4°83'0526 | 58511<br>32896<br>67690  | 11°082<br>6°230<br>12°820  | "               |
| 85              | Jhúsi<br>Allahabad No. 2<br>Allahabad No. 1 or Moia            | 43 30 11<br>79 21 29<br>57 8 20  | 3°98'3346<br>4°13'7975<br>4°06'9783 | 9624<br>13740<br>11743  | 1°823<br>2°602<br>2°224   | *<br>*<br>*         | 98              | Bhíta<br>Balaun Hill Mark<br>Uswar                  | 39 15 34<br>94 9 14              | 4°56'9671<br>4°62'9567<br>4°76'7240 | 37125<br>42615<br>58511  | 7°031<br>8°071<br>11°082   | "               |
| 86              | Singraur, XV<br>Allahabad Fort<br>Allahabad, Begam's Mausoleum | 5 16 35<br>23 58 47              | 4°24'7982<br>4°89'3349<br>4°97'3436 | 17700<br>78226<br>94067 | 3°352<br>14°815<br>17°816 | 18<br>*<br>*        | 99              | Bagála, XII<br>Balaun Hill Mark<br>Uswar            | 76 6 51<br>59 20 16              | 4°56'9671<br>4°42'8584<br>4°51'7146 | 37125<br>26828<br>32896  | 7°031<br>5°081<br>6°230    | "               |
| 87              | Allahabad Fort<br>Badra<br>Allahabad, Begam's Mausoleum        | 130 57 49<br>26 23 33            | 4°47'8113<br>4°24'7982<br>4°18'5556 | 30069<br>17700<br>15331 | 5°695<br>3°352<br>2°904   | *<br>*<br>*         | 100             | Bagála, XII<br>Uswar<br>Bárah                       | 29 3 5<br>102 51 44<br>48 5 11   | 4°24'3195<br>4°54'5886<br>4°42'8584 | 17506<br>35147<br>26828  | 3°316<br>6°657<br>5°081    | "               |
| 88              | Allahabad Fort<br>Jhúsi<br>Jhúsi Temple                        | 27 7 19<br>93 37 37              | 3°65'5315<br>3°99'5588<br>3°93'0663 | 4522<br>9899<br>8524    | 0°856<br>1°875<br>1°614   | *<br>*<br>*         | 101             | Bagála, XII<br>Balaun Hill Mark<br>Bárah            | 47 3 46<br>62 7 30               | 4°43'5279<br>4°54'5886<br>4°51'7146 | 27245<br>35147<br>32896  | 5°160<br>6°657<br>6°230    | "               |
| 89              | Allahabad Fort<br>Badra<br>Jhúsi Temple                        | 22 4 43<br>31 8 36               | 3°85'6993<br>3°99'5588<br>4°18'5556 | 7194<br>9899<br>15331   | 1°363<br>1°875<br>2°904   | *<br>*<br>*         | 102             | Bagála, XII<br>Bárah<br>Maduria                     | 70 45 52<br>29 14 24<br>79 59 44 | 4°52'7591<br>4°24'1377<br>4°54'5886 | 33697<br>17433<br>35147  | 6°382<br>3°302<br>6°657    | "               |
| 90              | Allahabad Fort<br>Jhúsi<br>Allahabad House No. 5               | 96 55 2<br>55 28 58              | 4°26'1631<br>4°18'0708<br>3°93'0663 | 18265<br>15100<br>8524  | 3°459<br>2°871<br>1°614   | *<br>*<br>*         | 103             | Bagála, XII<br>Uswar<br>Maduria                     | 41 42 47<br>40 1 16              | 4°25'6202<br>4°24'1377<br>4°42'8584 | 18039<br>17433<br>26828  | 3°416<br>3°302<br>5°081    | "               |
| 91              | Allahabad Fort<br>Badra<br>Allahabad House No. 5               | 47 43 0<br>65 25 7               | 4°09'1097<br>4°18'0708<br>4°18'5556 | 12334<br>15100<br>15331 | 2°336<br>2°871<br>2°904   | *<br>*<br>*         | 104             | Bagála, XII<br>Bhíta<br>Ganges River No. 2          | 29 28 35<br>60 8 43<br>90 22 42  | 4°52'2558<br>4°76'8700<br>4°83'0526 | 33309<br>58708<br>67690  | 6°308<br>11°119<br>12°820  | "               |
| 92              | Allahabad Fort<br>Jhúsi<br>Ibrahimpur Idgáh                    | 57 53 34<br>102 14 23            | 4°37'292<br>4°38'394<br>3°93'0663   | 21247<br>24513<br>8524  | 4°024<br>4°643<br>1°614   | *<br>*<br>*         | 105             | Bhíta<br>Ganges River No. 2<br>Ganges River No. 4   | 37 54 32<br>62 36 2<br>79 29 26  | 4°31'8361<br>4°47'8230<br>4°52'2558 | 20814<br>30077<br>33309  | 3°942<br>5°696<br>6°308    | "               |
| 93              | Allahabad Fort<br>Badra<br>Ibrahimpur Idgáh                    | 8 41 32<br>157 24 10             | 3°98'4121<br>4°38'394<br>4°18'5556  | 9641<br>24513<br>15331  | 1°826<br>4°643<br>2°904   | *<br>*<br>*         | 106             | Bhíta<br>Ganges River No. 4<br>Mámabhina            | 46 42 40<br>59 24 45<br>73 52 35 | 4°35'7733<br>4°43'0587<br>4°47'8230 | 22789<br>26952<br>30077  | 4°316<br>5°104<br>5°696    | "               |
| 94              | Allahabad Fort<br>Jhúsi<br>Arail White Temple                  | 47 6 45<br>38 26 2               | 3°76'6897<br>3°72'5495<br>3°93'0663 | 6265<br>5315<br>8524    | 1°186<br>1°007<br>1°614   | *<br>*<br>*         | 107             | Ganges River No. 4<br>Mámabhina<br>Allahabad Church | 59 8 22<br>84 52 50              | 4°52'2422<br>4°58'6987<br>4°35'7733 | 33298<br>38636<br>22789  | 6°306<br>7°317<br>4°316    | "               |

\* Instrument not known.

| No. of Triangle | Station                                             | Corrected Plane Angle         | Distance                                  |                         |                              | No. of Triangle | Station                                                | Corrected Plane Angle         | Distance                                  |                         |                              | Theodolite used |
|-----------------|-----------------------------------------------------|-------------------------------|-------------------------------------------|-------------------------|------------------------------|-----------------|--------------------------------------------------------|-------------------------------|-------------------------------------------|-------------------------|------------------------------|-----------------|
|                 |                                                     |                               | Log. feet                                 | Feet                    | Miles                        |                 |                                                        |                               | Log. feet                                 | Feet                    | Miles                        |                 |
| 108             | Bagála, XII<br>Maduria<br>Bhita Temple              | h.s.<br>56 17 14<br>109 23 8  | 4° 7' 67908<br>4° 8' 22237<br>4° 24' 1377 | 58601<br>66455<br>17433 | 11° 099<br>12° 586<br>3° 302 | 121             | Bagála, XII<br>Maduria<br>Tilapur W. Temple            | h.s.<br>28 35 5<br>134 29 40  | 4° 45' 7253<br>4° 6' 30093<br>4° 24' 1377 | 28658<br>42726<br>17433 | 5° 428<br>8° 092<br>3° 302   | Inch<br>12<br>" |
| 109             | Bagála, XII<br>Uswar<br>Bhita Temple                | h.s.<br>14 34 27<br>155 57 37 | 4° 6' 13306<br>4° 8' 22527<br>4° 42' 8584 | 41049<br>66455<br>26828 | 7° 774<br>12° 586<br>5° 081  | 122             | Bagála, XII<br>Uswar<br>Durgapur Temple                | h.s.<br>55 14 27<br>84 30 16  | 4° 53' 2863<br>4° 6' 16225<br>4° 42' 8584 | 34109<br>41326<br>26828 | 6° 460<br>7° 827<br>5° 081   | "<br>"<br>"     |
| 110             | Bagála, XII<br>Uswar<br>Bagála Hill Temple          | h.s.<br>78 14 14<br>12 8 23   | 4° 41' 9376<br>3° 75' 1425<br>4° 42' 8584 | 26265<br>5642<br>26828  | 4° 974<br>1° 069<br>5° 081   | 123             | Bagála, XII<br>Maduria<br>Durgapur Temple              | h.s.<br>13 31 40<br>156 58 31 | 4° 39' 2968<br>4° 6' 16225<br>4° 24' 1377 | 24715<br>41326<br>17433 | 4° 681<br>7° 827<br>3° 302   | "<br>"<br>"     |
| 111             | Bagála, XII<br>Maduria<br>Bagála Hill Temple        | h.s.<br>119 57 1<br>13 34 19  | 4° 31' 8723<br>3° 75' 1425<br>4° 24' 1377 | 20832<br>5642<br>17433  | 3° 945<br>1° 069<br>3° 302   | 124             | Singraur, XV<br>Allahabad Church<br>Tikri Gopálpur     | "<br>33 59 10<br>121 53 16    | 4° 74' 4285<br>4° 6' 08333<br>4° 92' 5830 | 55499<br>40582<br>84300 | 10° 511<br>7° 686<br>15° 966 | "<br>"<br>"     |
| 112             | Bagála, XII<br>Bárah<br>Parbajabad Hill Temple      | s.<br>20 46 10<br>75 36 34    | 4° 08' 332<br>4° 53' 4738<br>4° 54' 5886  | 12541<br>34256<br>35147 | 2° 375<br>6° 488<br>6° 657   | 125             | Singraur, XV<br>Tikri Gopálpur<br>Kandipur             | "<br>27 45 18<br>116 54 41    | 4° 32' 6209<br>4° 42' 0291<br>4° 6' 08333 | 21194<br>26320<br>40582 | 4° 014<br>4° 985<br>7° 686   | "<br>"<br>"     |
| 113             | Uswar<br>Bárah<br>Parbajabad Hill Temple            | h.s.<br>42 13 46<br>27 31 23  | 4° 00' 8332<br>3° 93' 5638<br>4° 24' 1377 | 12541<br>8623<br>17506  | 2° 375<br>1° 633<br>3° 316   | 126             | Singraur, XV<br>Tikri Gopálpur<br>Haidarganj           | "<br>35 27 18<br>136 7 10     | 3° 93' 3411<br>4° 53' 0977<br>4° 6' 08333 | 8578<br>33961<br>40582  | 1° 625<br>6° 432<br>7° 686   | "<br>"<br>"     |
| 114             | Bagála, XII<br>Maduria<br>Bhúri Hill Temple         | h.s.<br>78 17 26<br>50 46 37  | 4° 34' 2156<br>4° 24' 0418<br>4° 24' 1377 | 21987<br>17395<br>17433 | 4° 164<br>3° 294<br>3° 302   | 127             | Singraur, XV<br>Kandipur<br>Haidarganj                 | "<br>116 59 38<br>43 40 36    | 4° 100' 899<br>4° 53' 0977<br>4° 42' 0291 | 12615<br>33961<br>26320 | 2° 389<br>6° 432<br>4° 985   | "<br>"<br>"     |
| 115             | Bagála, XII<br>Maduria<br>Bagála House              | h.s.<br>47 42 6<br>25 4 23    | 4° 13' 0333<br>3° 88' 8441<br>4° 24' 1377 | 13500<br>7735<br>17433  | 2° 557<br>1° 465<br>3° 302   | 128             | Singraur, XV<br>Allahabad Church<br>Ojaini             | "<br>22 17 11<br>22 39 12     | 4° 85' 4707<br>4° 36' 1971<br>4° 92' 5830 | 71566<br>23013<br>84300 | 13° 554<br>4° 359<br>15° 966 | "<br>"<br>"     |
| 116             | Bagála, XII<br>Maduria<br>Bobandar Zamindár's House | h.s.<br>58 55 52<br>69 38 0   | 4° 28' 0973<br>4° 32' 0186<br>4° 24' 1377 | 19097<br>20902<br>17433 | 3° 617<br>3° 959<br>3° 302   | 129             | Singraur, XV<br>Kandipur<br>Hatiadi                    | "<br>35 58 49<br>109 35 49    | 4° 15' 0174<br>4° 15' 6899<br>4° 42' 0291 | 14131<br>14352<br>26320 | 2° 676<br>2° 718<br>4° 985   | "<br>"<br>"     |
| 117             | Bagála, XII<br>Maduria<br>Purkas Masjid             | h.s.<br>53 33 28<br>100 41 10 | 4° 61' 7941<br>4° 69' 3755<br>4° 24' 1377 | 41490<br>49403<br>17433 | 7° 858<br>9° 357<br>3° 302   | 130             | Singraur, XV<br>Ojaini<br>Hatiadi                      | "<br>18 20 11<br>131 14 11    | 4° 14' 0161<br>4° 15' 6899<br>4° 36' 1971 | 13809<br>14352<br>23013 | 2° 615<br>2° 718<br>4° 359   | "<br>"<br>"     |
| 118             | Bagála, XII<br>Maduria<br>Tilapur S.E. Temple       | h.s.<br>26 49 54<br>133 35 38 | 4° 37' 0825<br>4° 57' 6178<br>4° 24' 1377 | 23487<br>37686<br>17433 | 4° 448<br>7° 137<br>3° 302   | 131             | Singraur, XV<br>Tikri Gopálpur<br>Ganges River No. 3   | "<br>15 38 59<br>132 36 29    | 4° 40' 1555<br>4° 78' 0018<br>4° 92' 5830 | 25209<br>60258<br>84300 | 4° 774<br>11° 413<br>15° 966 | "<br>"<br>"     |
| 119             | Bagála, XII<br>Uswar<br>Tilapur S.E. Temple         | h.s.<br>68 32 41<br>69 36 4   | 4° 57' 3115<br>4° 57' 6178<br>4° 42' 8584 | 37421<br>37686<br>26828 | 7° 087<br>7° 137<br>5° 081   | 132             | Singraur, XV<br>Allahabad Church<br>Ganges River No. 3 | "<br>80 29 55<br>75 54 58     | 4° 48' 0922<br>4° 78' 0018<br>4° 92' 5830 | 30897<br>60258<br>84300 | 5° 852<br>11° 413<br>15° 966 | "<br>"<br>"     |
| 120             | Bagála, XII<br>Uswar<br>Tilapur W. Temple           | h.s.<br>70 17 52<br>72 50 12  | 4° 62' 4277<br>4° 63' 0693<br>4° 42' 8584 | 42100<br>42726<br>26828 | 7° 973<br>8° 002<br>5° 081   | 133             | Allahabad Church<br>Ganges River No. 3<br>Chapri       | "<br>80 29 55<br>75 54 58     | 4° 105' 360<br>4° 49' 177<br>4° 48' 9922  | 12746<br>31418<br>30897 | 2° 414<br>5° 950<br>5° 852   | "<br>"<br>"     |

## SECONDARY TRIANGULATION. TRIANGLES.

19—M.

| No. of Triangle | Station                                                       | Corrected Plane Angle            | Distance                            |                         |                            | No. of Triangle | Station                                             | Corrected Plane Angle | Distance                            |                         |                             | Theodolite used | Inch |
|-----------------|---------------------------------------------------------------|----------------------------------|-------------------------------------|-------------------------|----------------------------|-----------------|-----------------------------------------------------|-----------------------|-------------------------------------|-------------------------|-----------------------------|-----------------|------|
|                 |                                                               |                                  | Log. feet                           | Feet                    | Miles                      |                 |                                                     |                       | Log. feet                           | Feet                    | Miles                       |                 |      |
| 134             | Tikri Gopálpur<br>Ganges River No. 3<br>Chapri                | 28 12 57<br>82 32 12<br>69 14 51 | 4' 105360<br>4' 420992<br>4' 401555 | 12746<br>26730<br>25209 | 2' 414<br>5' 062<br>4' 774 | 147             | Singraur, XV<br>Kandipur<br>Mubarakpur Flag         | 53 7 55<br>80 48 33   | 4' 466027<br>4' 557315<br>4' 420291 | 29243<br>36084<br>26320 | 5' 539<br>6' 834<br>4' 985  | "               | 12   |
| 135             | Allahabad Church<br>Ganges River No. 3<br>Ditto. No. 5        | 97 8 25                          | 4' 445883<br>4' 002333<br>4' 489922 | 27918<br>10215<br>30897 | 5' 287<br>1' 935<br>5' 852 | 148             | Singraur, XV<br>Tikri Gopálpur<br>Sarai Flag        | 29 15 24<br>58 11 56  | 4' 297824<br>4' 538121<br>4' 008333 | 19853<br>34524<br>40582 | 3' 760<br>6' 539<br>7' 086  | "               | "    |
| 136             | Chapri<br>Ganges River No. 3<br>Ditto. No. 5                  | 91 29 51<br>27 9 14              | 4' 445883<br>4' 389305<br>4' 105360 | 27918<br>24508<br>12746 | 5' 287<br>4' 642<br>2' 414 | 149             | Tikri Gopálpur<br>Ganges River No. 3<br>Sarai Flag  | 73 2 15<br>44 21 43   | 4' 433913<br>4' 297824<br>4' 401555 | 27159<br>19853<br>25209 | 5' 144<br>3' 760<br>4' 774  | "               | "    |
| 137             | Allahabad Church<br>Ganges River No. 3<br>Muhammadpur         | 61 31 32<br>69 33 3              | 4' 395466<br>4' 462194<br>4' 489922 | 24858<br>28986<br>30897 | 4' 708<br>5' 490<br>5' 852 | 150             | Singraur, XV<br>Ojaini<br>Navabganj Flag            | 68 12 7               | 4' 510756<br>4' 595649<br>4' 361971 | 32416<br>32037<br>23013 | 6' 139<br>6' 068<br>4' 359  | "               | "    |
| 138             | Allahabad Church<br>Chapri<br>Muhammadpur                     | 87 29 0                          | 4' 129002<br>4' 462194<br>4' 497177 | 13459<br>28986<br>31418 | 2' 549<br>5' 490<br>5' 950 | 151             | Singraur, XV<br>Tikri Gopálpur<br>Navabganj Flag    | 54 20 46<br>49 54 58  | 4' 531781<br>4' 595649<br>4' 608333 | 34024<br>32037<br>40582 | 6' 444<br>6' 068<br>7' 086  | "               | "    |
| 139             | Ganges River No. 3<br>Ditto. No. 5<br>Muhammadpur             | 60 18 19<br>77 19 9              | 4' 285259<br>4' 395466<br>4' 445883 | 19287<br>24858<br>27918 | 3' 653<br>4' 708<br>5' 287 | 152             | Singraur, XV<br>Haidarganj<br>Koleha Dak Bungalow   | 83 5 14               | 3' 729643<br>4' 528120<br>4' 530977 | 5366<br>33738<br>33961  | 1' 016<br>6' 390<br>6' 432  | "               | "    |
| 140             | Ganges River No. 5<br>Muhammadpur<br>Aikpera                  | 96 17 42<br>55 33 20             | 4' 366350<br>4' 042709<br>4' 285259 | 23246<br>11033<br>19287 | 4' 493<br>2' 090<br>3' 653 | 153             | Singraur, XV<br>Ojaini<br>Korai Flag                | 8 33 41               | 4' 110418<br>4' 018688<br>4' 361971 | 12895<br>10440<br>23013 | 2' 442<br>1' 977<br>4' 359  | "               | "    |
| 141             | Chapri<br>Ganges River No. 5<br>Aikpera                       | 63 8 37<br>90 6 0                | 4' 042709<br>4' 339739<br>4' 389305 | 11033<br>21864<br>24508 | 2' 090<br>4' 141<br>4' 642 | 154             | Singraur, XV<br>Haidarganj<br>Korai Flag            | 7 33 49               | 4' 384371<br>4' 018688<br>4' 530977 | 24231<br>10440<br>33961 | 4' 589<br>1' 977<br>6' 432  | "               | "    |
| 142             | Muhammadpur<br>Allahabad Church<br>Allahabad Pháphaman        | 50 33 18<br>91 48 42             | 4' 350160<br>4' 248172<br>4' 462194 | 22395<br>17708<br>28986 | 4' 242<br>3' 354<br>5' 490 | 155             | Haidarganj<br>Tikri Gopálpur<br>Mufri-ka-purwa Flag | 37 25 16              | 3' 804892<br>3' 718563<br>3' 933411 | 6381<br>5231<br>8578    | 1' 209<br>0' 991<br>1' 025  | "               | "    |
| 143             | Chapri<br>Allahabad Church<br>Allahabad Pháphaman             | 43 12 16<br>73 49 26             | 4' 350160<br>4' 464492<br>4' 457177 | 22395<br>29140<br>31418 | 4' 242<br>5' 519<br>5' 950 | 156             | Haidarganj<br>Tikri Gopálpur<br>Bhika Masjid        | 41 2 24<br>20 52 21   | 3' 805121<br>3' 539632<br>3' 933411 | 6384<br>3464<br>8578    | 1' 209<br>0' 656<br>1' 025  | "               | "    |
| 144             | Ganges River No. 3<br>Allahabad Church<br>Allahabad Pháphaman | 37 6 21<br>56 20 14              | 4' 350160<br>4' 58850<br>4' 489922  | 22395<br>37055<br>30897 | 4' 242<br>7' 018<br>5' 852 | 157             | Singraur, XV<br>Ojaini<br>Fatehpur Mat              | 130 34 26             | 4' 051821<br>4' 498660<br>4' 361971 | 11267<br>31525<br>23013 | 2' 134<br>5' 971<br>4' 359  | "               | "    |
| 145             | Allahabad Pháphaman<br>Allahabad Church<br>Ganges River No. 6 | 57 23 55<br>60 45 23             | 4' 334908<br>4' 334678<br>4' 350160 | 21623<br>22630<br>22395 | 4' 095<br>4' 286<br>4' 242 | 158             | Singraur, XV<br>Ganges River No. 3<br>Fatehpur Mat  | 18 12 11<br>17 59 57  | 4' 503389<br>4' 498660<br>4' 780018 | 31870<br>31525<br>60358 | 6' 036<br>5' 971<br>11' 413 | "               | "    |
| 146             | Singraur, XV<br>Tikri Gopálpur<br>Mubarakpur Flag             | 25 22 37<br>62 42 22             | 4' 240600<br>4' 557315<br>4' 008333 | 17402<br>36084<br>40582 | 3' 296<br>6' 834<br>7' 086 | 159             | Singraur, XV<br>Ojaini<br>Ganipur Flag              | 19 50 23              | 4' 034577<br>4' 125234<br>4' 361971 | 16829<br>13343<br>23013 | 2' 051<br>2' 527<br>4' 359  | "               | "    |

| No. of Triangle | Station                                               | Corrected Plane Angle | Distance              |                         |                            | No. of Triangle | Station                                                                  | Corrected Plane Angle | Distance                            |                         |                            | Theodolite used | Inch |
|-----------------|-------------------------------------------------------|-----------------------|-----------------------|-------------------------|----------------------------|-----------------|--------------------------------------------------------------------------|-----------------------|-------------------------------------|-------------------------|----------------------------|-----------------|------|
|                 |                                                       |                       | Log. feet             | Feet                    | Miles                      |                 |                                                                          |                       | Log. feet                           | Feet                    | Miles                      |                 |      |
| 160             | Ojaini<br>Hatiadi<br>Ganges River No. 1               | s.<br>" "             | 19 13 6<br>23 9 15    | 6745<br>8057<br>13809   | 1' 277<br>1' 526<br>2' 615 | 170             | Chapri<br>Muhammadpur<br>Nimba Paka Koti                                 | s.<br>" "             | 4' 302088<br>4' 068153<br>4' 129002 | 20049<br>11699<br>13459 | 3' 797<br>2' 216<br>2' 549 | Theodolite used | 12   |
| 161             | Ojaini<br>Hatiadi<br>Alamchand Factory                | s.<br>" "             | 20 36 16<br>137 5 48  | 12807<br>24775<br>13809 | 2' 426<br>4' 692<br>2' 615 | 171             | Chapri<br>Ganges River No. 3<br>Nimba Paka Koti                          | s.<br>" "             | 3' 900173<br>4' 068153<br>4' 105360 | 7946<br>11699<br>12746  | 1' 505<br>2' 216<br>2' 414 | "               | "    |
| 162             | Singraur, XV<br>Hatiadi<br>Ganges River a             | s.                    | 43 27 45<br>34 34 22  | 10091<br>8325<br>14352  | 1' 911<br>1' 577<br>2' 718 | 172             | Chapri<br>Muhammadpur<br>Mau Masjid                                      | s.<br>" "             | 4' 233674<br>4' 232527<br>4' 129002 | 17127<br>17082<br>13459 | 3' 244<br>3' 235<br>2' 549 | "               | "    |
| 163             | Ojaini<br>Hatiadi<br>Ganges River a                   | s.<br>" "             | 41 2 1<br>75 1 27     | 10091<br>14849<br>13809 | 1' 911<br>2' 812<br>2' 615 | 173             | Ganges River No. 3<br>Chapri<br>Mau Masjid                               | s.<br>" "             | 4' 232527<br>4' 271738<br>4' 105360 | 17082<br>18696<br>12746 | 3' 235<br>3' 541<br>2' 414 | "               | "    |
| 164             | Singraur, XV<br>Hatiadi<br>Ojaini Masjid              | s.                    | 31 25 51<br>115 7 54  | 13582<br>23579<br>14352 | 2' 572<br>4' 466<br>2' 718 | 174             | Ganges River No. 3<br>Muhammadpur<br>Rangpur Temple                      | s.<br>" "             | 4' 369706<br>4' 022897<br>4' 395466 | 23426<br>41966<br>24858 | 4' 437<br>7' 948<br>4' 708 | "               | "    |
| 165             | Kandipur<br>Hatiadi<br>Ojaini Masjid                  | s.<br>" "             | 73 35 54<br>19 55 43  | 13582<br>4826<br>14131  | 2' 572<br>0' 914<br>2' 676 | 175             | Ganges River No. 3<br>Chapri<br>Rangpur Temple                           | s.<br>" "             | 4' 540150<br>4' 022897<br>4' 105360 | 34686<br>41966<br>12746 | 6' 569<br>7' 948<br>2' 414 | "               | "    |
| 166             | Singraur, XV<br>Hatiadi<br>Ojaini Mat                 | s.                    | 32 27 20<br>111 28 54 | 13083<br>22686<br>14352 | 2' 478<br>4' 297<br>2' 718 | 176             | Chapri<br>Muhammadpur<br>Rasulabad Ghat Temple                           | s.<br>" "             | 4' 277112<br>4' 434412<br>4' 129002 | 18928<br>27190<br>13459 | 3' 585<br>5' 150<br>2' 549 | "               | "    |
| 167             | Ganges River No. 3<br>Ditto.<br>Chapri Masjid         | s.<br>" "             | 28 6 6                | 24632<br>13150<br>27918 | 4' 665<br>2' 491<br>5' 287 | 177             | Muhammadpur<br>Allahabad Phaphaman<br>Rasulabad Ghat Temple              | s.<br>" "             | 3' 903079<br>4' 277112<br>4' 248172 | 8000<br>18928<br>17708  | 1' 515<br>3' 585<br>3' 354 | "               | "    |
| 168             | Tikri Gopalpur<br>Ganges River No. 3<br>Chapri Masjid | s.<br>" "             | 29 7 30<br>81 57 50   | 13150<br>26733<br>25209 | 2' 491<br>5' 067<br>4' 774 | 178             | Allahabad Phaphaman<br>Ganges River No. 6<br>Allahabad Phaphaman Chimney | s.<br>" "             | 4' 178267<br>4' 029530<br>4' 354678 | 15075<br>10704<br>22630 | 2' 855<br>2' 027<br>4' 286 | "               | "    |
| 169             | Chapri<br>Muhammadpur<br>Begam Sarai                  | s.<br>" "             | 17 33 33              | 28548<br>16233<br>13459 | 5' 407<br>3' 074<br>2' 549 | 179             | Ganges River No. 3<br>Allahabad Phaphaman<br>Ditto. Phaphaman Chimney    | s.<br>" "             | 4' 029530<br>4' 563548<br>4' 568850 | 10704<br>36066<br>37055 | 2' 027<br>6' 933<br>7' 018 | "               | "    |

J. B. N. HENNESSEY,  
In charge of Computing Office.

November 1879.

AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL,  
 PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

21—M.

\* Of the North-East Longitudinal Series.

| Name of station with azimuths of surrounding points                                                                                                                                                                                                                   | No. of triangle giving distance                                                                                                                                  | Name of station with azimuths of surrounding points                                                                                                                                                                                     | No. of triangle giving distance                                                  | Name of station with azimuths of surrounding points                                                                  | No. of triangle giving distance | Name of station with azimuths of surrounding points                                                                                                                                                        | No. of triangle giving distance                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| BADRA s.<br>Allahabad Fort<br>Allahabad Begam's Mausoleum<br>Allahabad Church<br>Allahabad House No. 5<br>Ibráhmipur Idgáh                                                                                                                                            | 53 12 2<br>79 35 35<br>96 24 51<br>118 37 9<br>210 36 12                                                                                                         | BHITA h.s.<br>Usvar<br>Ganges River No. 2<br>Ganges River No. 4<br>Allahabad Church<br>Mámabina                                                                                                                                         | 81<br>87<br>81<br>91<br>93                                                       | BHITA h.s.<br>Usvar<br>Ganges River No. 2<br>Ganges River No. 4<br>Allahabad Church<br>Mámabina                      | 98<br>104<br>105<br>96<br>106   | GANGES RIVER No. 2 s.<br>Bagála, XII<br>Ganges River No. 4<br>Bhita                                                                                                                                        | 104<br>105<br>104                                                                              |
| BAGALA, XII<br>Raghunáthpur Hill Mark (hel.)<br>Sirmaul, VIII<br>Mau, X<br>Kohi Hill Mark (heliotrope)<br>Chandaha Hill Mark (heliotrope)<br>Pabhosa, XIII<br>Purkas Masjid<br>Tilapur W. Temple<br>Tilapur S.E. Temple<br>Durgapur Temple<br>Singraur, XV<br>Maduria | 11 8 17<br>29 35 28.82<br>55 1 51.70<br>86 39 40<br>95 56 26<br>114 3 58.92<br>135 17 52<br>160 16 15<br>162 1 26<br>175 19 40<br>184 50 50.27<br>188 51 20      | BURWA, V<br>Jaládhār, II<br>Rewah Diwán's Temple<br>Rewah Large Temple<br>Dádar, III<br>Sirmaul, VIII<br>Gurwa Parur                                                                                                                    | 59<br>9<br>9<br>62<br>66<br>10<br>117                                            | BURWA, V<br>Jaládhār, II<br>Rewah Diwán's Temple<br>Rewah Large Temple<br>Dádar, III<br>Sirmaul, VIII<br>Gurwa Parur | 5<br>53<br>54<br>5<br>6<br>51   | GANGES RIVER No. 3 s.<br>Tikri Gopálpur<br>Fatehpur Mat<br>Singraur, XV<br>Sarai Flag<br>Chapri Masjid<br>Chapri<br>Muhammadpur<br>Allahabad Pháphamau<br>Rangpur Temple<br>Allahabad Pháphamau<br>Chimney | 131<br>158<br>131<br>149<br>167<br>133<br>137<br>144<br>174<br>179<br>135<br>173<br>171<br>132 |
| Ganges River No. 2<br>Allahabad Church<br>Allahabad Fort<br>Bagála House<br>Parbajabad Hill Temple<br>Bhita Temple<br>Bhita<br>Bobandar Zamindár's House<br>Bárah<br>Bhúri Hill Temple<br>Balaun Hill Mark<br>Bagála Hill Temple                                      | 217 24 42<br>225 3 13<br>230 34 7<br>230 36 51<br>236 33 26<br>238 51 2<br>245 8 34<br>246 53 17<br>247 47 12<br>259 37 12<br>267 8 46<br>306 40 58<br>308 48 21 | CHAPRI s.<br>Ganges River No. 3<br>Begam Sarai<br>Tikri Gopálpur<br>Muhammadpur<br>Allahabad Pháphamau<br>Rangpur Temple<br>Rasulabad Ghát Temple<br>Ganges River No. 5<br>Mau Masjid<br>Allahabad Church<br>Aikpera<br>Nimba Paka Koti | 133<br>169<br>134<br>188<br>143<br>175<br>176<br>186<br>172<br>133<br>141<br>170 | GANGES RIVER No. 4 s.<br>Ganges River No. 2<br>Allahabad Church<br>Mámabina<br>Bhita                                 | 105<br>107<br>106<br>105        | GANGES RIVER No. 5 s.<br>Aikpera<br>Ganges River No. 3<br>Chapri<br>Chapri Masjid<br>Muhammadpur<br>Allahabad Church                                                                                       | 140<br>135<br>136<br>167<br>139<br>135                                                         |
| BARA s.<br>Balaun Hill Mark<br>Bagála, XII<br>Maduria<br>Usvar<br>Parbajabad Hill Temple                                                                                                                                                                              | 17 32 23<br>79 39 53<br>108 54 17<br>127 45 4<br>155 16 27                                                                                                       | DADAR, III<br>Kaimár, I<br>Andhi Hill Mark (heliotrope)<br>Náru, IV<br>Kotar Kaimári, VI<br>Pati Hill Mark (heliotrope)<br>Donri, VII<br>Sirmaul, VIII<br>Burwa, V<br>Rewah Large Temple<br>Rewah Diwán's Temple<br>Jaládhār, II        | 101<br>100<br>102<br>100<br>112<br>108<br>96<br>116<br>100<br>114<br>97<br>110   | GANGES RIVER No. 6 s.<br>Allahabad Church<br>Allahabad Pháphamau<br>Chimney<br>Allahabad Pháphamau                   | 145<br>178<br>145               | GURWA PARUR h.s.<br>Jaládhār, II<br>Burwa, V<br>Sirmaul, VIII                                                                                                                                              | 52<br>51<br>51                                                                                 |
| BASANTPUR, XXIX<br>Parewa, XXVIII<br>Pesar, XXX<br>Turkani, XXXI<br>Tikini, XXVII                                                                                                                                                                                     | 59 48 27.38<br>120 21 57.04<br>181 49 0.28<br>359 37 10.54                                                                                                       | DONRI, VII<br>Kotar Kaimári, VI<br>Pati Hill Mark (heliotrope)<br>Haraha Hill Mark (heliotrope)<br>Kachár, IX<br>Mau, X<br>Sirmaul, VIII<br>Dádar, III                                                                                  | 35<br>36<br>37<br>35<br>97<br>96                                                 | HADARGANJ s.<br>Koleha Dák Bungalow<br>Kandipur<br>Korai Flag                                                        | 152<br>127<br>154               |                                                                                                                                                                                                            |                                                                                                |

| Name of station with azimuths of surrounding points                                                                                          | No. of triangles giving distance                     | Name of station with azimuths of surrounding points                                                                                                                   | No. of triangles giving distance             | Name of station with azimuths of surrounding points                                                                                                                                                                                    | No. of triangles giving distance                                                 | Name of station with azimuths of surrounding points                                                                                                                                                                                    | No. of triangles giving distance                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| HADARGANJ S.<br>Singraur, XV<br>Tikri Gopálpur<br>Bhika Masjid<br>Mufti-ka-purwa Flag                                                        | 126<br>126<br>156<br>155                             | JHUSI S.<br>Allahabad Fort Flagstaff<br>Allahabad<br>Allahabad Church<br>Allahabad Temple No. 1<br>Allahabad House No. 5<br>Jhusi Temple<br>Badra<br>Ibrahimpur Idgáh | 77<br>72<br>83<br>79<br>90<br>88<br>82<br>92 | KHARA, XXII<br>Sora, XXIV<br>Munai, XXIII<br>Tanghan, XXI<br>Horesa, XIX                                                                                                                                                               | 30<br>28<br>28<br>29                                                             | KHARA, XXII<br>Sora, XXIV<br>Munai, XXIII<br>Tanghan, XXI<br>Horesa, XIX                                                                                                                                                               | 30<br>28<br>28<br>29                                                             |
| HATIADI S.<br>Alamchand Factory<br>Singraur, XV<br>Ganges River a<br>Ojaini<br>Ojaini Mat<br>Ojaini Masjid<br>Ganges River No. 1<br>Kandipur | 161<br>129<br>162<br>130<br>166<br>164<br>160<br>129 | KACHAR, IX<br>Kotar Kaimári, VI<br>Haraha Hill Mark (heliotrope)<br>Bhauri Hill Mark (heliotrope)<br>Lálapur, XI<br>Mau, X<br>Donri, VII                              | 17<br>56<br>64<br>19<br>18<br>17             | KOTAR KAIMARI, VI<br>Náru, IV<br>Haraha Hill Mark (heliotrope)<br>Kachár, IX<br>Pati Hill Mark (heliotrope)<br>Donri, VII<br>Dádar, III<br>Andhi Hill Mark (heliotrope)                                                                | 15<br>55<br>17<br>58<br>16<br>15<br>49                                           | KOTAR KAIMARI, VI<br>Náru, IV<br>Haraha Hill Mark (heliotrope)<br>Kachár, IX<br>Pati Hill Mark (heliotrope)<br>Donri, VII<br>Dádar, III<br>Andhi Hill Mark (heliotrope)                                                                | 15<br>55<br>17<br>58<br>16<br>15<br>49                                           |
| HORESIA, XIX<br>Majilgaon, XVII<br>Khara, XXII<br>Tanghan, XXI<br>Salon, XX<br>Pariáon, XVIII                                                | 24<br>29<br>26<br>25<br>24                           | KANDUPUR, I<br>Náru, IV<br>Andhi Hill Mark (heliotrope)<br>Dádar, III<br>Jaliádhār, II<br>Marwás, XXVI*<br>Karara, XXIII*                                             | 14<br>50<br>4<br>2<br>3<br>2                 | LALAPUR, XI<br>Kachár, IX<br>Nagdípur, XIV<br>Pabhosa, XIII<br>Mau, X                                                                                                                                                                  | 19<br>21<br>20<br>19                                                             | LALAPUR, XI<br>Kachár, IX<br>Nagdípur, XIV<br>Pabhosa, XIII<br>Mau, X                                                                                                                                                                  | 19<br>21<br>20<br>19                                                             |
| IMLIA, XXXVI<br>Ashrafpur, XXXVIII<br>Thána, XXXVII<br>Ragaupur, XXXV<br>Samnadio, XXXIV                                                     | 44<br>43<br>42<br>42                                 | KANDUPUR S.<br>Hatiadi<br>Singraur, XV<br>Ojaini Masjid<br>Mubarakpur Flag<br>Tikri Gopálpur<br>Haidarganj                                                            | 129<br>125<br>165<br>147<br>125<br>127       | MADURIA h.s.<br>Bagála, XII<br>Purkas Masjid<br>Tilapur S. E. Temple<br>Tilapur W. Temple<br>Durgapur Temple<br>Bhita Temple<br>Uswar<br>Bárah<br>Bobandar Zamindár's House<br>Bhúri Hill Temple<br>Bagála House<br>Bagála Hill Temple | 102<br>117<br>118<br>121<br>123<br>108<br>103<br>102<br>116<br>114<br>115<br>111 | MADURIA h.s.<br>Bagála, XII<br>Purkas Masjid<br>Tilapur S. E. Temple<br>Tilapur W. Temple<br>Durgapur Temple<br>Bhita Temple<br>Uswar<br>Bárah<br>Bobandar Zamindár's House<br>Bhúri Hill Temple<br>Bagála House<br>Bagála Hill Temple | 102<br>117<br>118<br>121<br>123<br>108<br>103<br>102<br>116<br>114<br>115<br>111 |
| JALIADHAR, II<br>Karara, XXIII*<br>Kaimúr, I<br>Dádar, III<br>Burwa, V<br>Gurwa Parúr<br>Pabei<br>Marwás, XXVI*                              | 1<br>2<br>4<br>5<br>52<br>47<br>1                    | KARARA, XXIII*<br>Kaimúr, I<br>Jaliádhār, II<br>Pabei<br>Marwás, XXVI*                                                                                                | 2<br>1<br>47<br>1                            | MAJILGAON, XVII<br>Nagdípur, XIV<br>Horesa, XIX<br>Pariáon, XVIII<br>Karra, XVI                                                                                                                                                        | 22<br>24<br>23<br>22                                                             | MAJILGAON, XVII<br>Nagdípur, XIV<br>Horesa, XIX<br>Pariáon, XVIII<br>Karra, XVI                                                                                                                                                        | 22<br>24<br>23<br>22                                                             |
| JANAI, XXV<br>Munai, XXIII<br>Sora, XXIV<br>Tauli, XXVI<br>Tikini, XXVII                                                                     | 31<br>31<br>32<br>33                                 | KARRA, XVI<br>Pabhosa, XIII<br>Nagdípur, XIV<br>Majilgaon, XVII<br>Pariáon, XVIII<br>Singraur, XV                                                                     | 12<br>13<br>22<br>23<br>12                   | MAMABHINA S.<br>Bhita<br>Ganges River No. 4<br>Allahabad Church                                                                                                                                                                        | 106<br>106<br>107                                                                | MAMABHINA S.<br>Bhita<br>Ganges River No. 4<br>Allahabad Church                                                                                                                                                                        | 106<br>106<br>107                                                                |
| JHUSI S.<br>Allahabad No. 1 or Moia<br>Allahabad No. 2<br>Arail White Temple<br>Allahabad Fort<br>Allahabad Burial Ground                    | 85<br>84<br>94<br>82<br>95                           | KHANPUR, XXXIV†<br>Ashrafpur, XXXVIII<br>Mási, XXXV†<br>Thána, XXXVII                                                                                                 | 45<br>46<br>45                               | MARWÁS, XXVI*<br>Karara, XXIII*<br>Kaimúr, I<br>Jaliádhār, II<br>Pabei                                                                                                                                                                 | 1<br>3<br>1<br>48                                                                | MARWÁS, XXVI*<br>Karara, XXIII*<br>Kaimúr, I<br>Jaliádhār, II<br>Pabei                                                                                                                                                                 | 1<br>3<br>1<br>48                                                                |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral. † Of the North-East Longitudinal Series.

| Name of station with azimuths of surrounding points                                                                                                                                                                           | No. of triangle giving distance                                           | Name of station with azimuths of surrounding points                                                                                                                                                     | No. of triangle giving distance                                                                                            | Name of station with azimuths of surrounding points                                                                          | No. of triangle giving distance                                                                                                                                                                                                                                                                                                                                                                | Name of station with azimuths of surrounding points                                                                                              | No. of triangle giving distance |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| MASI, XXXV*<br>Thana, XXXVII<br>Khanpur, XXXIV*                                                                                                                                                                               | 46<br>46                                                                  | OJAINI s.<br>Alamchand Factory<br>Ganges River No. 1<br>Hatiadi<br>Korai Flag<br>Singraur, XV<br>Ganges River a<br>Gaupur Flag<br>Navabganj Flag<br>Allahabad Church<br>Fatehpur Mat                    | 161<br>160<br>180<br>153<br>128<br>163<br>159<br>150<br>128<br>157                                                         | 114 47 43<br>116 10 53<br>135 23 59<br>162 49 7<br>171 22 48<br>176 26 0<br>191 13 11<br>239 34 55<br>287 35 58<br>301 57 14 | 46 51 46.80<br>97 45 9.68<br>153 22 58.61<br>357 1 58.50                                                                                                                                                                                                                                                                                                                                       | RAGAUPUR, XXXV<br>Sannadto, XXXIV<br>Imlia, XXXVI<br>Thana, XXXVII<br>Amoli, XXXIII                                                              | 41<br>42<br>43<br>41            |
| MAU, X<br>Donri, VII<br>Kachar, IX<br>Bhauri Hill Mark (heliotrope)<br>Lalapur, XI<br>Pabhosa, XIII<br>Chandaha Hill Mark (heliotrope)<br>Bagala, XII<br>Chaukandi Hill Mark<br>Ragunathpur Hill Mark (hel.)<br>Sirmaul, VIII | 8<br>18<br>64<br>19<br>10<br>66<br>9<br>61<br>60<br>8                     | PABER h.s.<br>Marwas, XXVI†<br>Karara, XXIII†<br>Jaladhar, II                                                                                                                                           | 29 33 56<br>69 17 9<br>98 22 16                                                                                            | 21 16 33.64<br>60 36 52.72<br>96 52 59.51<br>146 47 21.93                                                                    | SALON, XX<br>Parison, XVIII<br>Horesa, XIX<br>Tanghan, XXI<br>Munai, XXIII                                                                                                                                                                                                                                                                                                                     | 25<br>25<br>26<br>27                                                                                                                             |                                 |
| MUHAMMADPUR s.<br>Nimba Pakakoti<br>Ganges River No. 3<br>Begam Sarai<br>Chapri<br>Rangpur Temple<br>Allahabad Phaphaman<br>Rasulabad Ghat Temple<br>Ganges River No. 5<br>Allahabad Church<br>Aikpera<br>Mau Masjid          | 170<br>187<br>169<br>188<br>174<br>142<br>176<br>189<br>137<br>140<br>172 | PABHOSA, XIII<br>Mau, X<br>Lalapur, XI<br>Bhauri Hill Mark (heliotrope)<br>Kohi Hill Mark (heliotrope)<br>Nagdlpur, XIV<br>Karra, XVI<br>Singraur, XV<br>Bagala, XII<br>Chandaha Hill Mark (heliotrope) | 8 32 34.27<br>59 35 5.45<br>60 58 6<br>63 53 21<br>145 54 14.00<br>187 38 7.11<br>232 10 2.43<br>293 56 26.97<br>303 49 10 | 158 58 16.49<br>226 47 37.49<br>296 52 55.87<br>356 26 9.11                                                                  | SINGRAUR, XV<br>Korai Flag<br>Kandipur<br>Bagala, XII<br>Hatiadi<br>Pabhosa, XIII<br>Karra, XVI<br>Navabganj Flag<br>Allahabad Church<br>Allahabad Fort<br>Sarai Flag<br>Mubarakpur Flag<br>Allahabad Begam's Mausoleum<br>Ganges River No. 3<br>Gaupur Flag<br>Fatehpur Mat<br>Tikri Gopalpur<br>Ganges River a<br>Haidarganj<br>Ojaini<br>Koleha Dak Bungalow<br>Ojaini Mat<br>Ojaini Masjid | 153<br>125<br>11<br>129<br>11<br>12<br>150<br>69<br>68<br>148<br>146<br>86<br>131<br>159<br>157<br>124<br>162<br>126<br>128<br>152<br>166<br>164 |                                 |
| MUNAI, XXIII<br>Tanghan, XXI<br>Khara, XXII<br>Sora, XXIV<br>Janai, XXV<br>Salon, XX                                                                                                                                          | 27<br>28<br>30<br>31<br>27                                                | PAREWA, XXVIII<br>Pesar, XXX<br>Basantpur, XXIX<br>Tikini, XXVII<br>Tauli, XXVI                                                                                                                         | 180 42 21.81<br>239 43 49.74<br>299 48 6.00<br>356 34 7.06                                                                 | 31 35 42.81<br>94 15 35.88<br>136 32 52.19<br>180 15 57                                                                      | SIRMAUL, VIII<br>Dadar, III<br>Donri, VII<br>Mau, X<br>Chaukandi Hill Mark<br>Bagala, XII<br>Ragunathpur Hill Mark (hel.)<br>Gurwa Parur<br>Burwa, V                                                                                                                                                                                                                                           | 6<br>7<br>8<br>61<br>9<br>59<br>51<br>6                                                                                                          |                                 |
| NAGDIPUR, XIV<br>Lalapur, XI<br>Kohi Hill Mark (heliotrope)<br>Majilgaon, XVII<br>Karra, XVI<br>Pabhosa, XIII                                                                                                                 | 21<br>63<br>22<br>13<br>13                                                | PARIAON, XVIII<br>Karra, XVI<br>Majilgaon, XVII<br>Horesa, XIX<br>Salon, XX                                                                                                                             | 0 28 55.46<br>64 58 56.67<br>128 15 46.37<br>201 14 22.17                                                                  | 31 35 42.81<br>94 15 35.88<br>136 32 52.19<br>180 15 57                                                                      | SIRMAUL, VIII<br>Dadar, III<br>Donri, VII<br>Mau, X<br>Chaukandi Hill Mark<br>Bagala, XII<br>Ragunathpur Hill Mark (hel.)<br>Gurwa Parur<br>Burwa, V                                                                                                                                                                                                                                           | 6<br>7<br>8<br>61<br>9<br>59<br>51<br>6                                                                                                          |                                 |
| NARU, IV<br>Kotar Kaimari, VI<br>Dadar, III<br>Kaimur, I                                                                                                                                                                      | 15<br>14<br>14                                                            | PESAR, XXX<br>Parewa, XXVIII<br>Utiama, XXXII<br>Turkani, XXXI<br>Basantpur, XXIX                                                                                                                       | 0 42 25.79<br>179 47 22.29<br>237 32 19.82<br>300 17 22.53                                                                 | 31 35 42.81<br>94 15 35.88<br>136 32 52.19<br>180 15 57                                                                      | SIRMAUL, VIII<br>Dadar, III<br>Donri, VII<br>Mau, X<br>Chaukandi Hill Mark<br>Bagala, XII<br>Ragunathpur Hill Mark (hel.)<br>Gurwa Parur<br>Burwa, V                                                                                                                                                                                                                                           | 6<br>7<br>8<br>61<br>9<br>59<br>51<br>6                                                                                                          |                                 |

\* Of the North-East Longitudinal Series. † Of the Calcutta Longitudinal Series of the South-East Quadrilateral.



| Name of station with azimuths of<br>surrounding points                                                  | No. of<br>triangles giving<br>distance                                            | Name of station with azimuths of<br>surrounding points                                                                                                                                                                    | No. of<br>triangles giving<br>distance                                                                                                                      | Name of station with azimuths of<br>surrounding points                                                                                                                                                     | No. of<br>triangles giving<br>distance                                                                                                         |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| SORA, XXIV<br>Khara, XXII<br>Tauli, XXVI<br>Janai, XXV<br>Munai, XXIII                                  | ° ' "<br>8 51 12.08<br>182 39 59.99<br>239 42 58.77<br>310 50 40.63               | TIKRI, XXVII<br>Janai, XXV<br>Tauli, XXVI<br>Parewa, XXVIII<br>Basantpur, XXIX                                                                                                                                            | ° ' "<br>5 7 16.22<br>58 11 53.48<br>119 52 44.92<br>179 37 12.68                                                                                           | TURKANI, XXXI<br>Utiāmau, XXXII<br>Amoli, XXXIII                                                                                                                                                           | ° ' "<br>118 25 43.33<br>172 48 8.41                                                                                                           |
| TANGHAN, XXI<br>Horesa, XIX<br>Khara, XXII<br>Munai, XXIII<br>Salon, XX                                 | ° ' "<br>12 46 18.61<br>131 28 25.14<br>204 4 1.86<br>276 48 21.21                | TIKRI GOPALPUR S.<br>Mufi-ka-purwa Flag<br>Bhika Masjid<br>Haidarganj<br>Kandipur<br>Singraur, XV<br>Navābganj Flag<br>Sarāi Flag<br>Mubārakpur Flag<br>Chapri Masjid<br>Chapri<br>Allahabad Church<br>Ganges River No. 3 | ° ' "<br>82 54 9<br>99 27 4<br>120 19 25<br>120 26 42<br>155 46 43<br>205 41 41<br>213 58 39<br>218 29 5<br>257 53 24<br>258 47 57<br>277 39 59<br>287 0 54 | USWAR h.s.<br>Bagāla Hill Temple<br>Bagāla, XII<br>Maduria<br>Tilapur S. E. Temple<br>Tilapur W. Temple<br>Durgapur Temple<br>Bhita Temple<br>Bhita<br>Parbajabad Hill Temple<br>Bārah<br>Balaun Hill Mark | ° ' "<br>38 27 20<br>50 35 43<br>90 36 59<br>120 11 47<br>123 25 55<br>135 5 59<br>254 38 6<br>257 6 13<br>265 30 13<br>307 43 59<br>351 15 27 |
| TAULI, XXVI<br>Sora, XXIV<br>Parewa, XXVIII<br>Tikri, XXVII<br>Janai, XXV                               | ° ' "<br>2 40 13.77<br>176 34 26.28<br>238 7 34.62<br>303 46 8.39                 | TURKANI, XXXI<br>Basantpur, XXIX<br>Pesar, XXX                                                                                                                                                                            | ° ' "<br>1 49 11.16<br>57 37 6.12                                                                                                                           | UTAMA, XXXII<br>Samnadio, XXXIV<br>Amoli, XXXIII<br>Turkani, XXXI<br>Pesar, XXX                                                                                                                            | ° ' "<br>176 26 28.43<br>234 47 11.25<br>298 20 54.88<br>359 47 21.05                                                                          |
| THANA, XXXVII<br>Imlia, XXXVI<br>Ashrafpur, XXXVIII<br>Khānpur, XXXIV*<br>Māsi, XXXV*<br>Ragaupur, XXXV | ° ' "<br>34 43 55.83<br>95 13 19.90<br>156 7 13.38<br>216 59 0.55<br>333 20 13.27 |                                                                                                                                                                                                                           |                                                                                                                                                             |                                                                                                                                                                                                            |                                                                                                                                                |

\* Of the North-East Longitudinal Series.

 J. B. N. HENNESSEY,  
In charge of Computing Office.

November 1879.

## KARARA MERIDIONAL SERIES.

## CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— $\lambda$  stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically,  $H_s$  for the Height when found by spirit leveling, and  $h$  for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of  $\lambda$  and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c.; secondary stations by the letters h.s. and s. The names in italics are those of the territories, states or districts in which the stations or points are situated.

| Name of station, district, description,<br>co-ordinates &c.                                                               | Name of station, district, description,<br>co-ordinates &c.                                                         | Name of station, district, description,<br>co-ordinates &c.                                                            |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Aikpera s.<br>(Allahabad) In field W. of the village.<br>" " "<br>$\lambda$ 25 27 44.56<br>L 81 52 14.48<br>Nos. 140, 141 | Allahabad, Berrill's Hotel.<br>(Allahabad)<br>" " "<br>$\lambda$ 25 25 49<br>L 81 54 21                             | Allahabad, Fort Flagstaff.<br>(Allahabad)<br>" " "<br>$\lambda$ 25 26 0.3<br>L 81 55 15.6<br>Nos. 76, 77               |
| Alamchand Factory,<br>(Allahabad) Chimney.<br>$\lambda$ 25 33 1.0<br>L 81 37 42.7<br>No. 161                              | Allahabad, Bhim's Lát,<br>(Allahabad) Column, in fort.<br>$\lambda$ 25 25 51.5<br>L 81 55 3.8                       | Allahabad Fort s.<br>(Allahabad) On main gate of fort.<br>$\lambda$ 25 25 53.87<br>L 81 54 59.76<br>No. 68             |
| Aliganj Temple.<br>(Lucknow)<br>$\lambda$ 26 55 46.6<br>L 81 0 33.2                                                       | Allahabad, Burial Ground,<br>(Allahabad) Colonel Humphrey's Tomb.<br>$\lambda$ 25 26 19.2<br>L 81 54 11.4<br>No. 95 | Allahabad, House No. 1.<br>(Allahabad) Flag on Treasurer's house in Dáraganj.<br>$\lambda$ 25 26 52<br>L 81 55 36      |
| Allahabad, Begam's House.<br>(Allahabad)<br>$\lambda$ 25 26 37<br>L 81 53 33                                              | Allahabad Church,<br>(Allahabad) Steeple.<br>$\lambda$ 25 27 43.3<br>L 81 54 12.7<br>Nos. 69, 70, 107               | Allahabad, House No. 2.<br>(Allahabad) Staircase of Gosáin's house in Kyd-ganj.<br>$\lambda$ 25 25 47.3<br>L 81 54 3.1 |
| Allahabad, Begam's Mausoleum.<br>(Allahabad) In Khuro Bágh.<br>$\lambda$ 25 26 31.0<br>L 81 51 51.0<br>Nos. 86, 87        | Allahabad, Dáraganj, S.E. Temple.<br>(Allahabad)<br>$\lambda$ 25 26 27.8<br>L 81 55 33.5                            | Allahabad, House No. 3.<br>(Allahabad) E. chimney of Mr. Lang's house.<br>$\lambda$ 25 27 53.5<br>L 81 54 6.3          |

| Name of station, district, description,<br>co-ordinates &c.                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Allahabad, House No. 4 s.<br/>(Allahabad) On Mr. Lowther's house in Colonel-ganj.</p> <p>λ 25 27 15.03<br/>L 81 53 47.29<br/>Nos. 73, 74</p> | <p>Allahabad No. 1, or Moia s.<br/>(Allahabad) About 0.6 of a mile N.W. of village of the same name.</p> <p>λ 25 23 19.65<br/>L 81 56 29.36<br/>No. 85</p>                                                                                        | <p>Amoli, XXXIII.<br/>(Vide page 9—M.)</p> <p>λ 27 5 40.72<br/>L 81 23 48.91<br/>H 420<br/>h 30<br/>No. 39</p>                                                                                                                                      |
| <p>Allahabad, House No. 5.<br/>(Allahabad) E. chimney of Mr. Montgomery's house.</p> <p>λ 25 28 23.4<br/>L 81 55 15.5<br/>Nos. 90, 91</p>       | <p>Allahabad No. 2 s.<br/>(Allahabad) Close to Pura Fateh village, about 1 mile S. of Arail, the same distance N. of Daudnagar, and <math>\frac{1}{2}</math> of a mile W. of Deorah village.</p> <p>λ 25 24 12.02<br/>L 81 55 1.66<br/>No. 84</p> | <p>Andhi Hill Mark (heliotrope).<br/>(Baghelkhand, Rewah State) On a detached hill on the right bank of Magardha nadi, and about <math>2\frac{1}{4}</math> miles N.E. of Beharra village.</p> <p>λ 24 28 34.91<br/>L 81 2 58.06<br/>Nos. 49, 50</p> |
| <p>Allahabad, House No. 6.<br/>(Allahabad) Chimney of Mr. Wilson's house in Motiganj.</p> <p>λ 25 25 32.4<br/>L 81 53 11.2</p>                  | <p>Allahabad, Pháphamau Chimney,<br/>(Allahabad) Of Powder Works on right bank of the Ganges.</p> <p>λ 25 29 49.7<br/>L 81 54 50.2<br/>Nos. 178, 179</p>                                                                                          | <p>Arail White Temple.<br/>(Allahabad)</p> <p>λ 25 25 8.5<br/>L 81 55 29.2<br/>No. 94</p>                                                                                                                                                           |
| <p>Allahabad, House No. 7.<br/>(Allahabad) Kalas of Rája Odidnarain's house in Motiganj.</p> <p>λ 25 25 22.9<br/>L 81 52 55.0</p>               | <p>Allahabad, Pháphamau s.<br/>(Allahabad) At S.W. extremity of village, on left bank of the Ganges.</p> <p>λ 25 31 24.78<br/>L 81 53 58.50<br/>Nos. 142, 143, 144</p>                                                                            | <p>Ashrafpur, XXXVIII.<br/>(Vide page 9—M.)</p> <p>λ 27 29 26.81<br/>L 81 4 9.54<br/>H 450<br/>h 24<br/>No. 44</p>                                                                                                                                  |
| <p>Allahabad, House No. 8.<br/>(Allahabad) Top of Rámsulhai's house in Kydganj.</p> <p>λ 25 25 47<br/>L 81 53 50</p>                            | <p>Allahabad s.<br/>(Allahabad) On a house in Chitpur, occupied by the Surveyor General's Office in 1845.</p> <p>λ 25 26 59.68<br/>L 81 53 40.50<br/>Nos. 71, 72</p>                                                                              | <p>Badra s.<br/>(Allahabad) About 2 miles N. of Jhúsi, and the same distance N.E. of Dáraganj.</p> <p>λ 25 27 24.86<br/>L 81 57 13.68<br/>No. 81</p>                                                                                                |
| <p>Allahabad, Juma Masjid,<br/>(Allahabad) Kalas.</p> <p>λ 25 25 50.3<br/>L 81 54 32.6<br/>No. 75</p>                                           | <p>Allahabad, Shah Hujjat's Masjid.<br/>(Allahabad)</p> <p>λ 25 26 7.2<br/>L 81 52 54.3</p>                                                                                                                                                       | <p>Badra, Sayyid's Tomb.<br/>(Allahabad)</p> <p>λ 25 27 16<br/>L 81 57 13</p>                                                                                                                                                                       |
| <p>Allahabad, Magistrate's Kachahri.<br/>(Allahabad)</p> <p>λ 25 26 42<br/>L 81 53 32</p>                                                       | <p>Allahabad, Sikuti Temple,<br/>(Allahabad) Spire.</p> <p>λ 25 29 57.9<br/>L 81 55 4.9</p>                                                                                                                                                       | <p>Bagála, XII.<br/>(Vide page 5—M.)</p> <p>λ 25 14 9.15<br/>L 81 39 13.31<br/>H 617<br/>h 0<br/>No. 9</p>                                                                                                                                          |
| <p>Allahabad, Mangal Dás's Temple.<br/>(Allahabad) On right bank of the Jumna.</p> <p>λ 25 25 11.3<br/>L 81 54 14.9</p>                         | <p>Allahabad, Sultán's Mausoleum.<br/>(Allahabad) In Khusro Bágh.</p> <p>λ 25 26 30.9<br/>L 81 51 53.1</p>                                                                                                                                        | <p>Bagála Hill Temple,<br/>(Allahabad) Dome.</p> <p>λ 25 13 34.1<br/>L 81 40 1.2<br/>Nos. 110, 111</p>                                                                                                                                              |
| <p>Allahabad, Masonic Lodge.<br/>(Allahabad)</p> <p>λ 25 26 40<br/>L 81 54 23</p>                                                               | <p>Allahabad Temple No. 1.<br/>(Allahabad) N.E. Temple in Dáraganj.</p> <p>λ 25 27 24.3<br/>L 81 55 37.1<br/>Nos. 79, 80</p>                                                                                                                      |                                                                                                                                                                                                                                                     |
| <p>Allahabad, Mr. Macaura's House.<br/>(Allahabad)</p> <p>λ 25 27 52<br/>L 81 54 39</p>                                                         | <p>Allahabad Temple No. 2.<br/>(Allahabad) N.E. temple in Samdabad.</p> <p>λ 25 26 55.8<br/>L 81 53 22.8<br/>No. 78</p>                                                                                                                           |                                                                                                                                                                                                                                                     |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                    | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Bagála House.</b><br><i>(Allahabad)</i> Zamindár's house in village.<br>$\lambda$ 25 14 51.4<br>$L$ 81 40 23.6<br>No. 115                                   | <b>Basti s.</b><br><i>(Bara Banki)</i> Close to and S.S.W. of village so called.<br>$\lambda$ 26 55 49.34<br>$L$ 81 8 9.17                                                                                        | <b>Bobandar Zamindár's House,</b><br><i>(Allahabad)</i> Staircase.<br>$\lambda$ 25 15 27.4<br>$L$ 81 42 44.1<br>No. 116                                                                                    |
| <b>Bahádurganj Temple.</b><br><i>(Rae Bareilly)</i> On left bank of the Ganges.<br>$\lambda$ 25 49 27.8<br>$L$ 81 22 32.6                                      | <b>Begam Sarái.</b><br><i>(Allahabad)</i> Flag on tree, E. end of village.<br>$\lambda$ 25 27 12.6<br>$L$ 81 48 14.5<br>No. 169                                                                                   | <b>Bulbulpur Flag.</b><br><i>(Bara Banki)</i><br>$\lambda$ 26 57 26<br>$L$ 81 14 45                                                                                                                        |
| <b>Bahádurpur Mat.</b><br><i>(Bara Banki)</i><br>$\lambda$ 26 57 16.2<br>$L$ 81 15 21.1                                                                        | <b>Beti Flag.</b><br><i>(Sitapur)</i> About $\frac{1}{2}$ a mile N.E. of village so called.<br>$\lambda$ 27 17 22<br>$L$ 81 11 27                                                                                 | <b>Burwa, V.</b><br><i>(Vide page 4—M.)</i><br>$\lambda$ 24 33 14.48<br>$L$ 81 31 17.03<br>$H$ 1300<br>$h$ Not forthcoming<br>No. 5                                                                        |
| <b>Baisingpurwa Flag.</b><br><i>(Bahraich)</i> On mound.<br>$\lambda$ 27 37 26<br>$L$ 81 21 38                                                                 | <b>Bhauri Hill Mark (heliotrope).</b><br><i>(Banda)</i> On a detached hill on left bank of Ohan nadi. Bhauri village lies at the N.E. foot of the hill.<br>$\lambda$ 25 13 32.61<br>$L$ 81 6 16.64<br>Nos. 64, 65 | <b>Chandaha Hill Mark (heliotrope).</b><br><i>(Banda)</i> On a range of hills running N.E. and S.W. Bariári Khurd lies to N. and Dínháí to S.E.<br>$\lambda$ 25 14 48.79<br>$L$ 81 32 12.69<br>Nos. 66, 67 |
| <b>Balaun Hill Mark.</b><br><i>(Allahabad)</i> On a detached hill E. of Repatna, and N.W. of Osa village.<br>$\lambda$ 25 10 54.40<br>$L$ 81 44 0.53<br>No. 97 | <b>Bhika Masjid,</b><br><i>(Allahabad)</i> Spire of N. minaret.<br>$\lambda$ 25 29 7.4<br>$L$ 81 43 3.7<br>No. 156                                                                                                | <b>Chapri Masjid,</b><br><i>(Allahabad)</i> Centre dome.<br>$\lambda$ 25 29 52.5<br>$L$ 81 48 58.0<br>Nos. 167, 168                                                                                        |
| <b>Bankesar Flag.</b><br><i>(Allahabad)</i> On tree.<br>$\lambda$ 25 33 50<br>$L$ 81 57 20                                                                     | <b>Bhisamda Gola Flag.</b><br><i>(Bahraich)</i> About $\frac{1}{2}$ a mile W.S.W. of station No. 189 of the Gogra River Triangulation.<br>$\lambda$ 27 12 5.5<br>$L$ 81 32 53.4                                   | <b>Chapri s.</b><br><i>(Allahabad)</i> At southern extremity of village on N. bank of the Ganges.<br>$\lambda$ 25 29 48.34<br>$L$ 81 48 58.67<br>Nos. 133, 134                                             |
| <b>Banwa, Khajúr Tree.</b><br><i>(Bara Banki)</i><br>$\lambda$ 26 56 37<br>$L$ 81 15 33                                                                        | <b>Bhita h.s.</b><br><i>(Allahabad)</i> E. of village.<br>$\lambda$ 25 18 31.93<br>$L$ 81 50 31.82<br>No. 96                                                                                                      | <b>Chaukandi Hill Mark.</b><br><i>(Baghelkhand, Rewah State)</i> On a detached hill, N.W. of village so called.<br>$\lambda$ 25 0 27.31<br>$L$ 81 26 10.03<br>No. 61                                       |
| <b>Bárah s.</b><br><i>(Allahabad)</i> Near gateway of old fort.<br>$\lambda$ 25 15 11.75<br>$L$ 81 45 29.91<br>Nos. 100, 101                                   | <b>Bhita Temple,</b><br><i>(Allahabad)</i> White.<br>$\lambda$ 25 18 45.5<br>$L$ 81 50 10.5<br>Nos. 108, 109                                                                                                      | <b>Chilári Flag.</b><br><i>(Sitapur)</i> On banian tree opposite to N.E. bastion near gateway.<br>$\lambda$ 27 33 55<br>$L$ 81 20 12                                                                       |
| <b>Bareti s.</b><br><i>(Bara Banki)</i> About $\frac{1}{2}$ a mile S.S.W. of village so called.<br>$\lambda$ 26 57 51.75<br>$L$ 81 9 33.13                     | <b>Bhúri Hill Temple,</b><br><i>(Allahabad)</i> Centre.<br>$\lambda$ 25 14 17.7<br>$L$ 81 42 22.5<br>No. 114                                                                                                      | <b>Chináhat s.</b><br><i>(Lucknow)</i> About $\frac{1}{2}$ of a mile S. of village so called.<br>$\lambda$ 26 52 7.13<br>$L$ 81 4 33.96                                                                    |
| <b>Basantpur, XXIX.</b><br><i>(Vide page 8—M.)</i><br>$\lambda$ 26 43 27.75<br>$L$ 81 24 56.79<br>$H$ 394<br>$h$ 24<br>No. 35                                  |                                                                                                                                                                                                                   |                                                                                                                                                                                                            |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Dádar, III.<br/>(<i>Vide page 4—M.</i>)</p> <p>λ 24 36 13·68<br/>L 81 14 46·40<br/>H 1088<br/>h <i>Not forthcoming</i><br/>No. 4</p> <p>Daroda Flag.<br/>(<i>Rae Bareilly</i>) On tree.<br/>λ 26 19 6<br/>L 81 19 11</p> <p>Daryabad Temple.<br/>(<i>Allahabad</i>)<br/>λ 25 43 2·1<br/>L 81 24 40·3</p> <p>Dhakuli s.<br/>(<i>Bara Banki</i>) About 1½ miles N.W. of Nawábganj,<br/>1½ miles W. of Bahádurpur, and 3 miles E. of<br/>Ganaura village.<br/>λ 26 57 11·07<br/>L 81 14 8·19</p> <p>Donri, VII.<br/>(<i>Vide page 5—M.</i>)<br/>λ 24 53 56·77<br/>L 81 13 45·65<br/>H 1415<br/>h I<br/>Nos. 7, 16</p> <p>Durgapur Temple,<br/>(<i>Allahabad</i>) Spire.<br/>λ 25 20 57·2<br/>L 81 38 36·6<br/>Nos. 122, 123</p> <p>Fatehpur Mat,<br/>(<i>Allahabad</i>) Spire, N. of village on left bank of the<br/>Ganges.<br/>λ 25 30 19·1<br/>L 81 43 32·6<br/>Nos. 157, 158</p> <p>Gadia s.<br/>(<i>Bara Banki</i>) About 2½ miles E. of Basti s., and<br/>1 mile S.W. of Malukpur village.<br/>λ 26 55 53·44<br/>L 81 10 43·44</p> <p>Ganges River a.<br/>(<i>Allahabad</i>) On tamarind tree on N. bank.<br/>λ 25 33 45<br/>L 81 41 38<br/>Nos. 162, 163</p> | <p>Ganges River No. 1.<br/>(<i>Allahabad</i>) Mango tree on right bank.<br/>λ 25 31 53<br/>L 81 40 29<br/>No. 160</p> <p>Ganges River No. 2 s.<br/>(<i>Allahabad</i>) In field N. of Asraul village.<br/>λ 25 21 50·95<br/>L 81 45 42·20<br/>No. 104</p> <p>Ganges River No. 3 s.<br/>(<i>Allahabad</i>) On right bank of the river.<br/>λ 25 27 43·85<br/>L 81 48 35·52<br/>Nos. 181, 182</p> <p>Ganges River No. 4 s.<br/>(<i>Allahabad</i>) In field.<br/>λ 25 23 19·75<br/>L 81 49 7·05<br/>No. 105</p> <p>Ganges River No. 5 s.<br/>(<i>Allahabad</i>) On right bank of the river.<br/>λ 25 29 14·12<br/>L 81 53 23·50<br/>Nos. 135, 136</p> <p>Ganges River No. 6 s.<br/>(<i>Allahabad</i>)<br/>λ 25 29 35·11<br/>L 81 57 33·95<br/>No. 145</p> <p>Ganges River No. 7 s.<br/>(<i>Allahabad</i>) Also called Nika s.; on N. bund of a<br/>tank, 0·3 of a mile S.E. of village of the same name,<br/>1 mile from the left bank of the river, and 0·4 of a<br/>mile E. of Chatnagh village.<br/>λ 25 24 35·38<br/>L 81 57 56·51<br/>See Synoptical Volume of the Gurwáni Meridional<br/>Series.</p> <p>Ganges River No. 8 s.<br/>(<i>Allahabad</i>) Also called Nimbi No. 1 s.; on N.<br/>bank, close to it the river forms two channels, the<br/>larger of which flows under Lowana and the smaller<br/>by the station, 0·7 of a mile W. of village of the<br/>same name. Marked by a mound 8 feet in height.<br/>λ 25 23 14·54<br/>L 81 58 4·49<br/>See Synoptical Volume of the Gurwáni Meridional<br/>Series.</p> <p>Ganges River No. 9* s.<br/>(<i>Allahabad</i>) Also called Lowana s. or Lowen s.; on<br/>right bank, about 50 yards N. of village of the same<br/>name, and 1½ miles E. of the Grand Trunk Road from<br/>Mirzapur to Allahabad.<br/>λ 25 21 59·47<br/>L 81 57 22·52<br/>See Synoptical Volume of the Gurwáni Meridional<br/>Series.</p> | <p>Ganipur Flag.<br/>(<i>Allahabad</i>) On mango tree at W. extremity of<br/>village on left bank of the Ganges.<br/>λ 25 33 3<br/>L 81 42 11<br/>No. 159</p> <p>Ghuri s.<br/>(<i>Rae Bareilly</i>) About ¼ a mile N.W. of village so<br/>called.<br/>λ 26 16 13·66<br/>L 81 16 43·75</p> <p>Gochaura, Zamíndár's House.<br/>(<i>Bara Banki</i>)<br/>λ 26 51 7<br/>L 81 18 48</p> <p>Gogra River No. 164† s.<br/>(<i>Bara Banki</i>) On right bank, 1·2 miles N.W. of<br/>Dhema, and 0·4 of a mile N.E. of Nausara.<br/>λ 26 53 10·50<br/>L 81 48 19·18</p> <p>Gogra River No. 165 s.<br/>(<i>Gonda</i>) On left bank, 0·6 of a mile N.W. of<br/>Sirsaipurwa, and 0·7 of a mile E. of the Sarju river.<br/>λ 26 54 59·14<br/>L 81 48 17·16</p> <p>Gogra River No. 166 s.<br/>(<i>Bara Banki</i>) Also called Rudpur Ghát station;<br/>on right bank of the river, 0·3 of a mile N. N. W.<br/>of Buláki Purwa, and 0·1 of a mile E. of Rudarpur.<br/>λ 26 55 14·22<br/>L 81 46 10·58</p> <p>Gogra River No. 167 s.<br/>(<i>Gonda</i>) On left bank, 0·7 of a mile S. of Upadia<br/>Purwa, and 0·2 of a mile W.N.W. of Pasika.<br/>λ 26 56 43·91<br/>L 81 47 14·23</p> <p>Gogra River No. 168 s.<br/>(<i>Bara Banki</i>) On right bank, 1·1 miles N. W. of<br/>Rudpur, 0·8 of a mile N. of Basgaon, and 0·5 of a<br/>mile E. of Garhi.<br/>λ 26 56 26·22<br/>L 81 44 32·43</p> <p>Gogra River No. 169 s.<br/>(<i>Gonda</i>) On left bank, in the centre of a large<br/>patch of Jháu jungle.<br/>λ 26 58 28·87<br/>L 81 45 17·39</p> |

\* The continuation of this triangulation will be found in the Co-ordinate List of the Gurwáni Meridional Series. † The preceding portion of this triangulation will be found in the Co-ordinate List of the Gurwáni Meridional Series and the continuation in that of the North-East Longitudinal Series.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gogra River No. 170 s.<br>(Bara Banki) On right bank, 0.6 of a mile N.N.E. of Bhaia Purwa, 0.1 of a mile E.N.E. of Kanrsar, and 0.9 of a mile E.S.E. of Kamiari.<br>λ 26 57 51.83<br>L 81 43 28.65                                | Gogra River No. 179 s.<br>(Gonda) On left bank, close to and E.S.E. of Basantpur, 0.4 of a mile W.S.W. of Lalpur, and 0.3 of a mile N.W. of Padmanpur.<br>λ 27 4 28.32<br>L 81 35 1.97                                                                                            | Gogra River No. 188 s.<br>(Bara Banki) On right bank, 1.5 miles S.E. of Gurbakhshi Purwa, 1.1 miles S.S.E. of Sukhramsing Purwa, and 0.5 of a mile E.S.E. of Kamine.<br>λ 27 11 37.58<br>L 81 31 8.95                                             |
| Gogra River No. 171 s.<br>(Gonda) On left bank, 0.8 of a mile N.N.E. of Kamiari Ghat 0.7 of a mile S.S.E. of Rami Purwa, and 0.5 of a mile W.S.W. of Raiapur.<br>λ 26 59 36.14<br>L 81 43 18.31                                   | Gogra River No. 180 s.<br>(Bara Banki) On right bank, 0.2 of a mile N.W. of Durga Austi Purwa, 0.6 of a mile N.N.W. of Para, and 0.8 of a mile N.E. of Sipai.<br>λ 27 3 40.45<br>L 81 32 59.37                                                                                    | Gogra River No. 189 s.<br>(Bahraich) Also called Mathrepur station; is situated on a mound in the village, on left bank of the river, about 1/4 mile W. of Sakhi, and the same distance E.N.E. of Bhisamda Gola.<br>λ 27 12 38.42<br>L 81 33 4.07 |
| Gogra River No. 172 s.<br>(Bara Banki) On right bank.<br>λ 26 58 56.23<br>L 81 41 49.91                                                                                                                                           | Gogra River No. 181 s.<br>(Bahraich) On left bank, 0.3 of a mile S.S.E. of Adampur, 0.9 of a mile W.S.W. of Ghuranpur, and 0.6 of a mile E.N.E. of Sipah.<br>λ 27 6 4.10<br>L 81 33 11.14                                                                                         | Gogra River No. 190 s.<br>(Bara Banki) Also called Pande Purwa; on right bank, 0.6 of a mile N.E. of Pande Purwa, and 0.1 of a mile S.S.E. of Pandit Purwa.<br>λ 27 13 40.63<br>L 81 30 41.95                                                     |
| Gogra River No. 173 s.<br>(Gonda) On left bank, 0.9 of a mile S.S.E. of Garwar, and 0.6 of a mile S.W. of Aksaria.<br>λ 27 0 54.08<br>L 81 41 13.57                                                                               | Gogra River No. 182 s.<br>(Bara Banki) On right bank, 1.0 mile N.N.W. of Balapur, 0.2 of a mile N.N.E. of Sisaura Purwa, and 0.8 of a mile E.N.E. of Lahara.<br>λ 27 5 4.96<br>L 81 30 43.74                                                                                      | Gogra River No. 191 s.<br>(Bahraich) On left bank.<br>λ 27 15 17.50<br>L 81 31 43.30                                                                                                                                                              |
| Gogra River No. 174 s.<br>(Bara Banki) Also called Lahramao Ghat station; on right bank, 1.4 miles N.E. of Manpur, and the same distance N.N.E. of Lahramao.<br>λ 27 0 4.77<br>L 81 39 27.58                                      | Gogra River No. 183 s.<br>(Bahraich) On left bank, 0.4 of a mile E.S.E. of Bairampur Ghat, 0.7 of a mile S.S.E. of Bairampur large village, and 0.2 of a mile N.W. of Khasapur.<br>λ 27 7 6.15<br>L 81 31 26.42                                                                   | Gogra River No. 192 s.<br>(Bara Banki) Also called Baniapara station; on right bank, 0.7 of a mile N. of Jamiulia, and 0.2 of a mile N.E. of Sitaram Purwa.<br>λ 27 15 16.78<br>L 81 30 6.33                                                      |
| Gogra River No. 175 s.<br>(Gonda) Also called Gharkunia Ghat station; on left bank, 0.3 of a mile W. of Gharkunia mud fort, 0.5 of a mile S. of Partabpur, and 0.6 of a mile S.E. of Deokalganj.<br>λ 27 2 22.73<br>L 81 39 26.27 | Gogra River No. 184 s.<br>(Bara Banki) Also called Ganespur Samadh; on right bank on paka shrine of a Hindu Saint, 0.6 of a mile N.N.E. of the large village of Ganespur, 0.5 of a mile N.E. of Firozpur, and 1.2 miles S.E. of Puraina on Sota.<br>λ 27 7 15.04<br>L 81 29 55.18 | Gogra River No. 193 s.<br>(Bahraich) On left bank, 0.7 of a mile S.S.W. of Girwarsing Purwa, and 0.5 of a mile W. of Gorhaia.<br>λ 27 16 56.40<br>L 81 31 20.38                                                                                   |
| Gogra River No. 176 s.<br>(Bara Banki) On right bank, 1.2 miles N.N.E. of Kawani, 1.3 miles E. of Sanawa, and 0.5 of a mile W.S.W. of Gurain Purwa.<br>λ 27 1 31.69<br>L 81 37 18.82                                              | Gogra River No. 185 s.<br>(Bahraich) On left bank, 0.1 of a mile S.W. of Simpurwa, 0.4 of a mile W.S.W. of Niamatpur, and 1.0 mile N.N.W. of Bharah.<br>λ 27 8 21.54<br>L 81 31 34.64                                                                                             | Gogra River No. 194 s.<br>(Bara Banki) On right bank, 0.4 of a mile N.N.E. of Khuji, and 0.5 of a mile E.S.E. of Banar.<br>λ 27 18 23.16<br>L 81 28 57.73                                                                                         |
| Gogra River No. 177 s.<br>(Gonda) On left bank, 0.3 of a mile S.E. of Gaora, 0.4 of a mile W. of Maikup Purwa, and 0.6 of a mile N.N.E. of Sanawa Ghat.<br>λ 27 3 38.29<br>L 81 37 8.17                                           | Gogra River No. 186 s.<br>(Bara Banki) On right bank.<br>λ 27 9 42.56<br>L 81 30 8.87                                                                                                                                                                                             | Gogra River No. 195 s.<br>(Bahraich) On left bank, 1.3 miles E. of Ghurata Ghat, 0.3 of a mile S.W. of Taukali Purwa, and 0.5 of a mile W.N.W. of Badraulia.<br>λ 27 19 1.53<br>L 81 30 49.54                                                     |
| Gogra River No. 178 s.<br>(Bara Banki) On right bank.<br>λ 27 2 35.92<br>L 81 35 34.82                                                                                                                                            | Gogra River No. 187 s.<br>(Bahraich) On left bank, 0.6 of a mile S.S.W. of Putti, 0.9 of a mile W.S.W. of Obadhi, and 0.2 of a mile W.N.W. of Nasirganj.<br>λ 27 10 33.56<br>L 81 32 38.81                                                                                        | Gogra River No. 196 s.<br>(Bara Banki) On right bank, 0.6 of a mile N.E. of Pasrampur, 0.8 of a mile S.S.E. of Pharus Ghat, and 0.3 of a mile N. of Ghauania.<br>λ 27 20 9.35<br>L 81 27 45.83                                                    |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                        | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                         | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Gogra River No. 197 s.<br/>(Bahraich) On left bank, 1·3 miles S.E. of Alipur, the same distance S. of Nandwal, and 0·5 of a mile S.W. of Deokali.</p> <p>λ 27 21 9·39<br/>L 81 30 17·67</p>                                     | <p>Gogra River No. 206 s.<br/>(Sitapur) On right bank, 0·1 of a mile W. of Ratnapur, 0·5 of a mile N.N.W. of Ofsaria, and 0·7 of a mile E.S.E. of Daorihar.</p> <p>λ 27 26 17·54<br/>L 81 21 21·40</p>              | <p>Gogra River No. 215 s.<br/>(Bahraich) On left bank, 0·5 of a mile S.S.W. of Rāmsing Purwa, and 0·4 of a mile N.N.W. of Bhola Purwa.</p> <p>λ 27 36 16·46<br/>L 81 21 33·07</p>                                                                                         |
| <p>Gogra River No. 198 s.<br/>(Bahraich) On left bank, 0·6 of a mile S.E. of Sarsat Purwa, 0·5 of a mile S.S.W. of Sepaia, and 0·6 of a mile W.S.W. of Hosainabad.</p> <p>λ 27 22 18·04<br/>L 81 28 11·77</p>                      | <p>Gogra River No. 207 s.<br/>(Bahraich) On left bank, 1·2 miles S.W. of Patkapur, and 0·7 of a mile N.W. of Chaubar.</p> <p>λ 27 28 34·56<br/>L 81 22 31·89</p>                                                    | <p>Gogra River No. 216 s.<br/>(Sitapur) On right bank, 0·5 of a mile N. of Ranjit Purwa Tola, 0·2 of a mile N.N.E. of Ranjit Purwa, and 0·3 of a mile S.S.E. of Laodhan Tola.</p> <p>λ 27 36 54·77<br/>L 81 19 9·69</p>                                                   |
| <p>Gogra River No. 199 s.<br/>(Sitapur) On right bank, 0·2 of a mile W. of Puraipur, 0·7 of a mile N.N.E. of Lelipur, and 0·2 of a mile E.N.E. of Daolatpur.</p> <p>λ 27 20 54·06<br/>L 81 26 40·00</p>                            | <p>Gogra River No. 208 s.<br/>(Sitapur) On right bank, 0·2 of a mile E.N.E. of Shankarpur, 0·7 of a mile S.W. of Mangalpur, and 0·8 of a mile N.N.W. of Bitani.</p> <p>λ 27 28 14·79<br/>L 81 19 54·34</p>          | <p>Gogra River No. 217 s.<br/>(Bahraich) On left bank, 0·4 of a mile N.N.W. of Pandipura, the same distance W.S.W. of Dubha, and 0·7 of a mile S. of Ranjitsing Purwa.</p> <p>λ 27 38 22·52<br/>L 81 21 47·30</p>                                                         |
| <p>Gogra River No. 200 s.<br/>(Bahraich) On left bank, 0·6 of a mile S.S.W. of Tulapur, and 1·4 miles W. of Bhaouri.</p> <p>λ 27 23 32·83<br/>L 81 26 6·63</p>                                                                     | <p>Gogra River No. 209 s.<br/>(Bahraich) On left bank, 0·5 of a mile W.N.W. of Kharkapur, and 0·7 of a mile from Naodhan in the same direction.</p> <p>λ 27 30 13·62<br/>L 81 22 9·19</p>                           | <p>Gogra River α s.<br/>(Bahraich) On left bank, 0·7 of a mile S.E. of Parsadsing Purwa, and 0·9 of a mile N.W. of Orai.</p> <p>λ 27 37 3·79<br/>L 81 23 13·05</p>                                                                                                        |
| <p>Gogra River No. 201 s.<br/>(Sitapur) Also called Bhaonri Ghāt s.; on right bank.</p> <p>λ 27 21 52·97<br/>L 81 23 58·02</p>                                                                                                     | <p>Gogra River No. 210 s.<br/>(Sitapur) On right bank, 1·2 miles N.N.E. of Rājpur, 0·5 of a mile E.N.E. of Bajwari, and 1·0 mile S. of Mujaon.</p> <p>λ 27 30 29·25<br/>L 81 20 16·42</p>                           | <p>Gogra River β s.<br/>(Bahraich) On left bank, N. of Dubha and N.W. of Ranjitsing Purwa, and 0·9 of a mile W.N.W. of Nakhai.</p> <p>λ 27 38 33·32<br/>L 81 23 21·33</p>                                                                                                 |
| <p>Gogra River No. 202 s.<br/>(Bahraich) On left bank in the midst of a Jhāu jungle.</p> <p>λ 27 24 38·67<br/>L 81 23 36·39</p>                                                                                                    | <p>Gogra River No. 211 s.<br/>(Sitapur) On right bank, 0·3 of a mile N. of Randa, 1·1 miles E. of Ramipur, and 0·7 of a mile S.S.E. of Nasirpur.</p> <p>λ 27 32 8·43<br/>L 81 20 46·47</p>                          | <p>Gumsira Masjid.<br/>(Partabgarh)</p> <p>λ 25 43 43·7<br/>L 81 26 1·1</p>                                                                                                                                                                                               |
| <p>Gogra River No. 203 s.<br/>(Sitapur) On right bank, 0·3 of a mile S.S.W. of Nindaora, 0·7 of a mile N.N.E. of Soharia, and 0·5 of a mile N.E. of Dombediha.</p> <p>λ 27 23 16·77<br/>L 81 22 32·12</p>                          | <p>Gogra River No. 212 s.<br/>(Bahraich) On left bank, 0·8 of a mile S.E. of Zalimsing Purwa, 0·7 of a mile W.S.W. of Bahirpur, and 0·9 of a mile W.N.W. of Bolwar Purwa.</p> <p>λ 27 32 1·07<br/>L 81 22 52·13</p> | <p>Gurwa Parūr h.s.<br/>(Baghelkhand, Rewah State) On Kaimūr range, 1½ miles N. W. of Baghawa village, and about the same distance W. by S. of the Rewah Topographical Survey station of Gurwa Parūr.</p> <p>λ 24 30 0·67<br/>L 81 49 3·32<br/>H 1652<br/>Nos. 51, 52</p> |
| <p>Gogra River No. 204 s.<br/>(Sitapur) On right bank, 0·9 of a mile E.S.E. of Para, and 0·4 of a mile S.W. of a Gola on nadi.</p> <p>λ 27 25 1·69<br/>L 81 21 48·96</p>                                                           | <p>Gogra River No. 213 s.<br/>(Bahraich) On left bank, 0·9 of a mile S. of Sisai Bazar, and 0·7 of a mile W.N.W. of Sisai village.</p> <p>λ 27 33 57·47<br/>L 81 22 16·20</p>                                       | <p>Gutni Building.<br/>(Partabgarh)</p> <p>λ 25 42 9<br/>L 81 26 4</p>                                                                                                                                                                                                    |
| <p>Gogra River No. 205 s.<br/>(Bahraich) On left bank, 0·3 of a mile N.N.W. of Baghati, 0·7 of a mile from Hazari Purwa in the same direction, and 0·4 of a mile S.S.E. of Kolaila Ghāt.</p> <p>λ 27 26 18·57<br/>L 81 23 8·12</p> | <p>Gogra River No. 214 s.<br/>(Sitapur) On right bank, 0·5 of a mile N.E. of Patkapur, and 0·8 of a mile E. of Mahuabág.</p> <p>λ 27 34 48·13<br/>L 81 19 57·60</p>                                                 | <p>Haidarganj s.<br/>(Allahabad) N. of village.</p> <p>λ 25 29 39·88<br/>L 81 42 51·65<br/>Nos. 126, 127</p>                                                                                                                                                              |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Haraha Hill Mark (heliotrope).<br/>(<i>Bundelkhand, Panna State</i>) On a small detached range of hills running N. W. and S. E. Salaura village lies about 2 miles N. E., and Deori the same distance W.</p> <p>o ' "</p> <p>λ 24 51 39.06<br/>L 81 0 3.86<br/>Nos. 55, 56</p> <p>Hatiadi s.<br/>(<i>Allahabad</i>) N. E. of village.</p> <p>λ 25 32 55.56<br/>L 81 40 2.40<br/>Nos. 129, 180</p> <p>Hetapati Temple,<br/>(<i>Allahabad</i>) Spire. Also called Saidaganj White Temple.</p> <p>λ 25 29 31.0<br/>L 81 58 21.2</p> <p>Hiliapura Flag.<br/>(<i>Sitapur</i>) Near village.</p> <p>λ 27 24 50<br/>L 81 14 21</p> <p>Horesa, XIX.<br/>(<i>Vide page 6—M.</i>)</p> <p>λ 25 55 23.20<br/>L 81 17 17.41<br/>H<sub>s</sub> 367.84*<br/>h 25.8<br/>No. 24</p> <p>Ibráhimpur Idgáh,<br/>(<i>Allahabad</i>) Centre dome.</p> <p>λ 25 28 47.1<br/>L 81 58 7.3<br/>Nos. 92, 98</p> <p>Imlia, XXXVI.<br/>(<i>Vide page 9—M.</i>)</p> <p>λ 27 19 18.90<br/>L 81 10 4.55<br/>H 451<br/>h 24<br/>No. 42</p> <p>Ismailganj Masjid,<br/>(<i>Lucknow</i>) S. minaret.</p> <p>λ 26 52 30.0<br/>L 81 3 12.3</p> <p>Jaliádhhar, II.<br/>(<i>Vide page 4—M.</i>)</p> <p>λ 24 22 24.55<br/>L 81 26 42.96<br/>H 2178<br/>h Not forthcoming<br/>No. 1</p> | <p>Janai, XXV.<br/>(<i>Vide page 7—M.</i>)</p> <p>o ' "</p> <p>λ 26 22 6.80<br/>L 81 23 58.30<br/>H 417<br/>h 24<br/>No. 31</p> <p>Jangirabad N. E. Bastion.<br/>(<i>Allahabad</i>)</p> <p>λ 25 41 7.6<br/>L 81 25 32.2</p> <p>Jhúsi s.<br/>(<i>Allahabad</i>) On left bank of the Ganges, about 1½ miles E. of Allahabad Fort.</p> <p>λ 25 25 35.75<br/>L 81 56 30.59<br/>Nos. 82, 83</p> <p>Jhúsi Temple.<br/>(<i>Allahabad</i>) Near Ghát.</p> <p>λ 25 26 18.8<br/>L 81 56 44.2<br/>Nos. 88, 89</p> <p>Kachár, IX.<br/>(<i>Vide page 5—M.</i>)</p> <p>λ 24 56 43.77<br/>L 81 5 18.46<br/>H 1467<br/>h 1<br/>No. 17</p> <p>Kaharpur Flag.<br/>(<i>Sitapur</i>) On tree.</p> <p>λ 27 21 57<br/>L 81 7 15</p> <p>Kaimúr, I.<br/>(<i>Vide page 4—M.</i>)</p> <p>λ 24 17 2.15<br/>L 81 11 49.65<br/>H 2263<br/>h 6<br/>Nos. 2, 3</p> <p>Kálikinkar Temple.<br/>(<i>Partabgarh</i>) On left bank of the Ganges.</p> <p>λ 25 47 21.2<br/>L 81 23 42.9</p> <p>Kandipur s.<br/>(<i>Allahabad</i>) N. of village.</p> <p>λ 25 30 43.33<br/>L 81 40 53.01<br/>No. 125</p> | <p>Kanjwara s.<br/>(<i>Bara Banki</i>) Near village so called.</p> <p>o ' "</p> <p>λ 27 0 2.35<br/>L 81 12 17.81</p> <p>Kantua Building.<br/>(<i>Allahabad</i>) On right bank of the Ganges.</p> <p>λ 25 46 31<br/>L 81 23 49</p> <p>Karara, XXIII.†<br/>(<i>Vide page 3—M.</i>)</p> <p>λ 24 4 42.01<br/>L 81 18 14.47<br/>H 1966<br/>h 3<br/>No. 1</p> <p>Karra, XVI.<br/>(<i>Vide page 6—M.</i>)</p> <p>λ 25 41 56.64<br/>L 81 24 38.96<br/>H<sub>s</sub> 382.80*<br/>h 27<br/>No. 12</p> <p>Khánpur, XXXIV.‡<br/>(<i>Vide page 9—M.</i>)</p> <p>λ 27 39 0.60<br/>L 81 11 50.98<br/>H 439<br/>h 12<br/>No. 45</p> <p>Khára, XXII.<br/>(<i>Vide page 7—M.</i>)</p> <p>λ 26 7 39.62<br/>L 81 13 10.35<br/>H 405<br/>h 25<br/>Nos. 28, 29</p> <p>Kohi Hill Mark (heliotrope).<br/>(<i>Bánda</i>) About 1 mile E. of Kolgadhia, and the same distance W. of Rehutia village.</p> <p>λ 25 12 2.10<br/>L 81 0 53.69<br/>Nos. 62, 63</p> <p>Koleha Dák Bungalow.<br/>(<i>Allahabad</i>) E. angle of roof.</p> <p>λ 25 29 31.7<br/>L 81 41 53.8<br/>No. 152</p> |

\* Refers to the mark-stone let into the upper surface of the basement on which the tower has been built. † Of the Calcutta Longitudinal Series of the South-East Quadrilateral. ‡ Of the North-East Longitudinal Series.



| Name of station, district, description,<br>co-ordinates &c.                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Korai Flag.<br>(Allahabad) On Ním tree in centre of village, on<br>right bank of the Ganges.<br>" " "<br>λ 25 33 20<br>L 81 41 7<br>Nos. 153, 154 | Lucknow, Constantia Building s.<br>(Lucknow) " " "<br>λ 26 50 21.63<br>L 81 0 19.82                             | Lucknow Palace,<br>(Lucknow) Highest Chatri.<br>" " "<br>λ 26 51 30.4<br>L 80 58 30.3                                                                                                                     |
| Kotar Kaimári, VI.<br>(Vide page 4—M.)<br>λ 24 43 19.82<br>L 81 2 52.16<br>H 1440<br>h Not forthcoming<br>No. 15                                  | Lucknow, Dilkusha Building s.<br>(Lucknow) "<br>λ 26 49 42.02<br>L 81 0 26.84                                   | Lucknow, Race Stand,<br>(Lucknow) N. spike.<br>λ 26 51 50<br>L 81 0 13                                                                                                                                    |
| Kuti Ghat Temple.<br>(Allahabad) On left bank of the Ganges.<br>λ 25 29 17.9<br>L 81 57 25.1                                                      | Lucknow, Hayát Baksh House,<br>(Lucknow) Gate opposite Dilkusha.<br>λ 26 50 26.8<br>L 80 59 20.2                | Lucknow Residency s.<br>(Lucknow) "<br>λ 26 51 41.22<br>L 80 58 6.16                                                                                                                                      |
| Lálapur, XI.<br>(Vide page 5—M.)<br>λ 25 14 13.95<br>L 81 8 23.73<br>H 773<br>h Not forthcoming<br>No. 19                                         | Lucknow, Kamta Bungalow,<br>(Lucknow) Centre Kalas.<br>λ 26 52 32.6<br>L 81 3 53.1                              | Lucknow, Saádat Ali's Mausoleum,<br>(Lucknow) Kalas.<br>λ 26 51 14.6<br>L 80 58 34.3                                                                                                                      |
| Lowana Tree.<br>(Allahabad) In centre of village.<br>λ 25 21 48<br>L 81 57 22<br>See Synoptical Volume of the Gurwáni Series.                     | Lucknow Karbala,<br>(Lucknow) Highest minaret.<br>λ 26 50 58.9<br>L 80 59 42.2                                  | Lucknow, Shuja-Uddaula's House,<br>(Lucknow) Highest turret.<br>λ 26 51 7.6<br>L 80 58 20.3                                                                                                               |
| Lucknow, Bari Masjid,<br>(Lucknow) Spire of N. minaret.<br>λ 26 52 10.3<br>L 80 57 17.1                                                           | Lucknow, Mausoleum No. 1.<br>(Lucknow) Kalas of Gházi-Uddín Haider's Mausoleum.<br>λ 26 51 29.4<br>L 80 59 19.5 | Maduapur Paka Well.<br>(Allahabad) Near village.<br>λ 25 24 45.3<br>L 81 54 36.1                                                                                                                          |
| Lucknow, Bari Masjid,<br>(Lucknow) Spire of S. minaret.<br>λ 26 52 8.4<br>L 80 57 17.2                                                            | Lucknow, Mausoleum No. 2.<br>(Lucknow) Kalas of Nasir-Uddín Haider's Mausoleum.<br>λ 26 52 31.0<br>L 80 58 6.7  | Maduria h.s.<br>(Allahabad) On a range of hills running S.W. and<br>N.E., but which here turns to S.E. Kothangi lies<br>E., and Marári Gurapur to N.W.<br>λ 25 16 59.79<br>L 81 39 42.55<br>Nos. 102, 103 |
| Lucknow, Begam's Mausoleum,<br>(Lucknow) Kalas.<br>λ 26 51 10.7<br>L 80 57 59.4                                                                   | Lucknow Moti Mahal.<br>(Lucknow) W. tower of palace.<br>λ 26 51 24.1<br>L 80 58 58.0                            | Mahmudabad, Munshi's Temple.<br>(Allahabad) "<br>λ 25 24 24<br>L 81 57 2                                                                                                                                  |
| Lucknow Church.<br>(Lucknow) N.W. spire of church in Mariao Cantonment, 1845.<br>λ 26 54 33.4<br>L 80 58 51.1                                     | Lucknow, New Palace.<br>(Lucknow) S. minaret of Masjid.<br>λ 26 50 44.4<br>L 80 59 15.9                         | Majilgaon, XVII.<br>(Vide page 6—M.)<br>λ 25 45 15.01<br>L 81 13 17.73<br>H <sub>s</sub> 395.53*<br>h 25<br>No. 22                                                                                        |
| Lucknow Church.<br>(Lucknow) S.W. spire of church in Mariao Cantonment, 1845.<br>λ 26 54 33.3<br>L 80 58 51.0                                     | Lucknow Observatory s.<br>(Lucknow) "<br>λ 26 51 12.54<br>L 80 58 56.93                                         | Mámabhina s.<br>(Allahabad) On W. bank of tank.<br>λ 25 22 18.98<br>L 81 53 6.40<br>No. 106                                                                                                               |

\* Refers to the mark-stone let into the upper surface of the pillar.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                   | Name of station, district, description,<br>co-ordinates &c.                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mánikpur Fort s.</b><br><i>(Partabgarh)</i> About $1\frac{1}{2}$ miles S. of Shahabad Idgáh,<br>and the same distance N. of Aliganj village.<br><br>$\lambda$ 25 45 47.16<br>$L$ 81 26 40.28 | <b>Mubárákpur Flag.</b><br><i>(Allahabad)</i> On tamarind tree, W. end of village.<br><br>$\lambda$ 25 31 12<br>$L$ 81 46 11<br>Nos. 146, 147 | <b>Naurangabad Khajúr Tree.</b><br><i>(Bara Banki)</i><br><br>$\lambda$ 26 58 17<br>$L$ 81 13 22                                                                 |
| <b>Manjpurwa Mat.</b><br><i>(Bara Banki)</i><br>$\lambda$ 26 56 42.0<br>$L$ 81 13 40.9                                                                                                          | <b>Mubárákpur Square Building.</b><br><i>(Rae Bareilly)</i><br>$\lambda$ 26 16 39.9<br>$L$ 81 14 34.4                                         | <b>Nawábganj Flag.</b><br><i>(Allahabad)</i><br>$\lambda$ 25 34 1<br>$L$ 81 46 54<br>Nos. 150, 151                                                               |
| <b>Mao Old Bastion, S.W.</b><br><i>(Partabgarh)</i><br>$\lambda$ 25 40 49.7<br>$L$ 81 27 25.2                                                                                                   | <b>Mufti-ka-purwa Flag.</b><br><i>(Allahabad)</i> On Ním tree in village.<br>$\lambda$ 25 28 49<br>$L$ 81 43 3<br>No. 155                     | <b>Nawábganj Flag.</b><br><i>(Bara Banki)</i> On Ním tree in centre of village.<br>$\lambda$ 26 56 9<br>$L$ 81 14 26                                             |
| <b>Marwás, XXVI*.</b><br><i>(Vide page 4—M.)</i><br>$\lambda$ 24 4 59.33<br>$L$ 81 49 2.46<br>$H$ 1776<br>$h$ 4<br>No. 1                                                                        | <b>Muhammadabad Flag.</b><br><i>(Sitapur)</i> On tree near fort.<br>$\lambda$ 27 17 50<br>$L$ 81 9 59                                         | <b>Niatál Flag.</b><br><i>(Sitapur)</i><br>$\lambda$ 27 21 39<br>$L$ 81 8 34                                                                                     |
| <b>Mási, XXXV†</b><br><i>(Vide page 10—M.)</i><br>$\lambda$ 27 38 25.17<br>$L$ 81 25 36.15<br>$H$ 425.89†<br>$h$ 24<br>No. 46                                                                   | <b>Muhammadpur s.</b><br><i>(Allahabad)</i> On S. end of village.<br>$\lambda$ 25 31 20.12<br>$L$ 81 50 45.24<br>Nos. 137, 138, 139           | <b>Nimba Paka Koti.</b><br><i>(Allahabad)</i> N.W. angle of staircase, on right bank<br>of the Ganges.<br>$\lambda$ 25 28 6.1<br>$L$ 81 49 58.7<br>Nos. 170, 171 |
| <b>Masudpur s.</b><br><i>(Bara Banki)</i> About $\frac{1}{2}$ a mile N.E. of village so<br>called.<br>$\lambda$ 26 57 50.94<br>$L$ 81 13 12.43                                                  | <b>Munai, XXIII.</b><br><i>(Vide page 7—M.)</i><br>$\lambda$ 26 10 51.18<br>$L$ 81 23 6.97<br>$H$ 397.56†<br>$h$ 25.5<br>No. 27               | <b>Núrpur Masjid,</b><br><i>(Sitapur)</i> S. minaret.<br>$\lambda$ 27 19 9.0<br>$L$ 81 11 29.5                                                                   |
| <b>Mau, X.</b><br><i>(Vide page 5—M.)</i><br>$\lambda$ 25 0 44.01<br>$L$ 81 18 12.26<br>$H$ 1381<br>$h$ Not forthcoming<br>Nos. 8, 13                                                           | <b>Muskabad Flag.</b><br><i>(Sitapur)</i> On house.<br>$\lambda$ 27 21 19<br>$L$ 81 8 54                                                      | <b>Núrpur s.</b><br><i>(Sitapur)</i> About $\frac{1}{2}$ a mile S.E. of village.<br>$\lambda$ 27 18 49.81<br>$L$ 81 11 49.26                                     |
| <b>Mau Masjid,</b><br><i>(Allahabad)</i> Centre dome, on right bank of the<br>Ganges.<br>$\lambda$ 25 28 40.8<br>$L$ 81 51 49.6<br>Nos. 172, 173                                                | <b>Nagdílpur, XIV.</b><br><i>(Vide page 6—M.)</i><br>$\lambda$ 25 34 16.82<br>$L$ 81 11 53.53<br>$H$ 404<br>$h$ 33<br>Nos. 13, 21             | <b>Ojaini Masjid,</b><br><i>(Allahabad)</i> S. minaret.<br>$\lambda$ 25 31 11.1<br>$L$ 81 41 35.9<br>Nos. 164, 165                                               |
| <b>Mír Sáin's Takia.</b><br><i>(Allahabad)</i> Khajúr tree amongst ruins.<br>$\lambda$ 25 46 19<br>$L$ 81 24 58                                                                                 | <b>Náru, IV.</b><br><i>(Vide page 4—M.)</i><br>$\lambda$ 24 29 38.28<br>$L$ 80 59 57.90<br>$H$ 1974<br>$h$ Not forthcoming<br>No. 14          | <b>Ojaini Mat.</b><br><i>(Allahabad)</i> N. of village, on right bank of the<br>Ganges.<br>$\lambda$ 25 31 20.4<br>$L$ 81 41 39.3<br>No. 166                     |
|                                                                                                                                                                                                 |                                                                                                                                               | <b>Ojaini s.</b><br><i>(Allahabad)</i> On Fakir's house N. of village, on right<br>bank of the Ganges.<br>$\lambda$ 25 31 18.18<br>$L$ 81 41 48.29<br>No. 128    |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.  
pillar.

† Of the North-East Longitudinal Series.

‡ Refers to the upper surface of the

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                  | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                 | Name of station, district, description,<br>co-ordinates &c.                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Orai s.<br/>(<i>Bahraich</i>) On a branch of the Sarju river, about ½ a mile N.W. of Bagha village.</p> <p>λ 27 35 43.41<br/>L 81 22 44.89</p>                                                                                            | <p>Parila Temple,<br/>(<i>Allahabad</i>) Spire.</p> <p>λ 25 32 47.2<br/>L 81 56 15.1</p>                                                                                                                                    | <p>Rasulabad Ghāt Temple.<br/>(<i>Allahabad</i>) On right bank of the Ganges.</p> <p>λ 25 30 5.6<br/>L 81 53 54.9<br/>Nos. 176, 177</p>         |
| <p>Pabei h.s.<br/>(<i>Baghelkhand, Rewah State</i>) On the highest part of the hill, about 1 mile E. of Pabei, 2 miles N. of Umrai, and 1 mile S. of Parkhuri village.</p> <p>λ 24 18 20.39<br/>L 81 57 17.31<br/>H 1958<br/>Nos. 47, 48</p> | <p>Pati Hill Mark (heliotrope).<br/>(<i>Bundelkhand, Panna State</i>) About 1 mile N. of Deogaon, and the same distance E. of Partābpur village.</p> <p>λ 24 52 48.20<br/>L 81 8 49.66<br/>Nos. 57, 58</p>                  | <p>Rewah, Dīwān's Temple.<br/>(<i>Baghelkhand, Rewah State</i>)</p> <p>λ 24 30 33.8<br/>L 81 20 31.7<br/>No. 53</p>                             |
| <p>Pabhosa, XIII.<br/>(<i>Vide page 5—M.</i>)</p> <p>λ 25 21 17.32<br/>L 81 21 35.58<br/>H 565<br/>h 0<br/>Nos. 10, 20</p>                                                                                                                   | <p>Pesar, XXX.<br/>(<i>Vide page 8—M.</i>)</p> <p>λ 26 48 47.87<br/>L 81 14 47.16<br/>H<sub>s</sub> 382.36†<br/>h 25<br/>No. 86</p>                                                                                         | <p>Rewah Fort.<br/>(<i>Baghelkhand, Rewah State</i>) Highest building in fort.</p> <p>λ 24 31 20.5<br/>L 81 20 0.2</p>                          |
| <p>Pahārnagar s.<br/>(<i>Lucknow</i>) Near Tikura village.</p> <p>λ 26 46 12.47<br/>L 81 5 22.49</p>                                                                                                                                         | <p>Purkas Masjid,<br/>(<i>Allahabad</i>) Spire of N. minaret.</p> <p>λ 25 19 56.9<br/>L 81 32 54.5<br/>No. 117</p>                                                                                                          | <p>Rewah Large Temple.<br/>(<i>Baghelkhand, Rewah State</i>)</p> <p>λ 24 31 20.0<br/>L 81 20 5.6<br/>No. 54</p>                                 |
| <p>Paighambarpur Dargāh,<br/>(<i>Allahabad</i>) Centre.</p> <p>λ 25 31 9.0<br/>L 81 58 11.8</p>                                                                                                                                              | <p>Rae Bareli Flag.<br/>(<i>Rae Bareli</i>) On tree within N. gate of fort.</p> <p>λ 26 14 1<br/>L 81 16 12</p>                                                                                                             | <p>Salon, XX.<br/>(<i>Vide page 7—M.</i>)</p> <p>λ 26 1 43.97<br/>L 81 29 44.13<br/>H<sub>s</sub> 410.15*<br/>h 25<br/>No. 25</p>               |
| <p>Paintepur, N. Masjid,<br/>(<i>Sitapur</i>) N. minaret.</p> <p>λ 27 16 46.3<br/>L 81 13 28.6</p>                                                                                                                                           | <p>Ragaupur, XXXV.<br/>(<i>Vide page 9—M.</i>)</p> <p>λ 27 17 44.37<br/>L 81 23 7.00<br/>H 389<br/>h 30<br/>No. 41</p>                                                                                                      | <p>Samnadio, XXXIV.<br/>(<i>Vide page 9—M.</i>)</p> <p>λ 27 10 7.34<br/>L 81 14 1.98<br/>H 431<br/>h 24<br/>No. 40</p>                          |
| <p>Parbajabad Hill Temple,<br/>(<i>Allahabad</i>) Old.</p> <p>λ 25 17 4.6<br/>L 81 44 32.8<br/>Nos. 112, 113</p>                                                                                                                             | <p>Raghunāthpur Hill Mark (heliotrope).<br/>(<i>Baghelkhand, Rewah State</i>) About 1 mile S. of village so called, and the same distance E. of Jenkahi village.</p> <p>λ 24 56 18.49<br/>L 81 35 22.12<br/>Nos. 59, 60</p> | <p>Sarāi Flag.<br/>(<i>Allahabad</i>) On tamarind tree N. of village.</p> <p>λ 25 31 40<br/>L 81 46 14<br/>Nos. 148, 149</p>                    |
| <p>Parewa, XXVIII.<br/>(<i>Vide page 8—M.</i>)</p> <p>λ 26 38 4.00<br/>L 81 14 38.32<br/>H<sub>s</sub> 405.62*<br/>h 30<br/>No. 34</p>                                                                                                       | <p>Rangpur Flag.<br/>(<i>Allahabad</i>) On height, N.E. of temple.</p> <p>λ 25 31 32<br/>L 81 55 6</p>                                                                                                                      | <p>Shahabad Idgāh.<br/>(<i>Partabgarh</i>)</p> <p>λ 25 46 57<br/>L 81 26 26</p>                                                                 |
| <p>Pariāon, XVIII.<br/>(<i>Vide page 6—M.</i>)</p> <p>λ 25 50 5.26<br/>L 81 24 43.49<br/>H 389<br/>h 25<br/>No. 23</p>                                                                                                                       | <p>Rangpur Temple,<br/>(<i>Allahabad</i>) Spire.</p> <p>λ 25 31 28.6<br/>L 81 55 0.8<br/>Nos. 174, 175</p>                                                                                                                  | <p>Shahzādpur s.<br/>(<i>Allahabad</i>) About 2 miles S. of Mao, and 2½ miles E. of Paharpur village.</p> <p>λ 25 39 13.55<br/>L 81 27 0.21</p> |

\* Refers to the mark-stone let into the upper surface of the pillar.

† Refers to the mark-stone let into the base of the tower.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Sidik-ki-purwa House,<br/>(Allahabad) Gable end.     °     '     "</p> <p>λ     25 25 5<br/>L     81 53 34</p> <p>Singraur, XV.<br/>(Vide page 6—M.)</p> <p>λ     25 35 3'56<br/>L     81 41 10'61<br/>H     379<br/>h     32<br/>No. 11</p> <p>Sirkini h.s.<br/>(Baghelkhand, Rewah State) About a mile N.E. of<br/>Ramri village.</p> <p>λ     24 33 25'37<br/>L     81 27 8'54</p> <p>Sirmaul, VIII.<br/>(Vide page 5—M.)</p> <p>λ     24 53 6'86<br/>L     81 26 7'78<br/>H     1115<br/>h     2<br/>No. 6</p> <p>Sora, XXIV.<br/>(Vide page 7—M.)</p> <p>λ     26 17 18'83<br/>L     81 14 50'30<br/>H     409<br/>h     24<br/>No. 30</p> <p>Sora Temple.<br/>(Rae Bareilly) In village.</p> <p>λ     26 17 32'8<br/>L     81 15 0'3</p> | <p>Tānghan, XXI.<br/>(Vide page 7—M.)     °     '     "</p> <p>λ     26 2 52'72<br/>L     81 19 10'10<br/>H     409<br/>h     25<br/>No. 26</p> <p>Tauli, XXVI.<br/>(Vide page 7—M.)</p> <p>λ     26 27 18'43<br/>L     81 15 21'33<br/>H<sub>s</sub>     412'88*<br/>h     30<br/>No. 32</p> <p>Thāna, XXXVII.<br/>(Vide page 9—M.)</p> <p>λ     27 28 24'00<br/>L     81 17 7'53<br/>H     421<br/>h     24†<br/>No. 43</p> <p>Tharwa Factory.<br/>(Allahabad) Also called Thorui Factory; flag on<br/>top of Mr. Sander's house.</p> <p>λ     25 32 33<br/>L     81 57 32</p> <p>Tikiri, XXVII.<br/>(Vide page 8—M.)</p> <p>λ     26 32 42'59<br/>L     81 25 1'56<br/>H     408<br/>h     30<br/>No. 33</p> | <p>Tikri Gopālpur s.<br/>(Allahabad) On right bank of the Ganges.     °     '     "</p> <p>λ     25 28 56'98<br/>L     81 44 12'47<br/>No. 124</p> <p>Tilapur, S.E. Temple.<br/>(Allahabad) Spire of large temple.</p> <p>λ     25 20 4'2<br/>L     81 37 6'5<br/>Nos. 118, 119</p> <p>Tilapur, W. Temple.<br/>(Allahabad) Spire of small temple.</p> <p>λ     25 20 47'5<br/>L     81 36 36'1<br/>Nos. 120, 121</p> <p>Turkani, XXXI.<br/>(Vide page 8—M.)</p> <p>λ     26 54 48'85<br/>L     81 25 20'89<br/>H<sub>s</sub>     390'22‡<br/>h     24<br/>No. 37</p> <p>Uswar h.s.<br/>(Allahabad) On a detached hill, at the S.E. foot of<br/>which lies the village so called.</p> <p>λ     25 16 57'90<br/>L     81 42 59'09<br/>Nos. 98, 99</p> <p>Utiāmau, XXXII.<br/>(Vide page 8—M.)</p> <p>λ     26 59 57'08<br/>L     81 14 44'42<br/>H<sub>s</sub>     404'66‡<br/>h     24<br/>No. 38</p> |

\* The height 412'88 refers to the surface described on page 8—M.  
‡ Refers to the mark-stone let into the base of the tower.

† Above the bastion of the fort on which the station is built.

*List of Published Works of the Great Trigonometrical Survey of India.*

---

An Account of the Measurement of an Arc of the meridian between the parallels of  $18^{\circ} 3'$  and  $24^{\circ} 7'$ , being a continuation of the Grand Meridional Arc of India as detailed by the late Lieutenant-Colonel Lambton in the Volumes of the Asiatic Society of Calcutta. By Captain George Everest, of the Bengal Artillery, F.R.S., &c. London, 1830.

An Account of the Measurement of two Sections of the Meridional Arc of India, bounded by the parallels of  $18^{\circ} 3' 5''$ ;  $24^{\circ} 7' 11''$ ; and  $29^{\circ} 30' 18''$ . By Lieutenant-Colonel Everest, F.R.S., &c., late Surveyor General of India, and his Assistants. London, 1847.

---

Account of the Operations of the Great Trigonometrical Survey of India.

- Volume I. The Standards of Measure and the Base-Lines, also an Introductory Account of the early Operations of the Survey, during the period of 1800-1830. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey. Dehra Dún, 1870.
- Do. II. History and General Description of the Principal Triangulation and of its Reduction. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.
- Do. III. The Principal Triangulation, the Base-Line Figures, the Karáchi Longitudinal, N.W. Himalaya, and Great Indus Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1873.
- Do. IV. The Principal Triangulation, the Great Arc (Section  $24^{\circ}$ - $30^{\circ}$ ), Rahún, Gurbágarh and Jogi-Tíla Meridional Series, and the Sutlej Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1876.
- Do. V. Details of the Pendulum Operations by Captains J. P. Basevi, R.E., and W. J. Heaviside, R.E., and of their Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún and Calcutta, 1879.
- Do. VI. The Principal Triangulation of the South-East Quadrilateral including the Great Arc—Section  $18^{\circ}$  to  $24^{\circ}$ , the East Coast Series, the Calcutta and the Bider Longitudinal Series, the Jabalpur and the Biláspur Meridional Series, and the Details of their Simultaneous Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1880.

*List of Published Works of the Great Trigonometrical Survey of India—(Continued).*

Account of the Operations of the Great Trigonometrical Survey of India—(Continued).

- Volume VII. General Description of the Principal Triangulation of the North-East Quadrilateral including the Simultaneous Reduction and the Details of Five of the Component Series, the North-East Longitudinal, the Budhon Meridional, the Rangir Meridional, the Amua Meridional, and the Karára Meridional. Prepared under the directions of Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
- Do. VIII. Details of the Principal Triangulation of Eleven of the Component Series of the North-East Quadrilateral, including the following Series; the Gurwáni Meridional, the Gora Meridional, the Hurílaong Meridional, the Chendwár Meridional, the North Párasnáth Meridional, the North Malúncha Meridional, the Calcutta Meridional, the East Calcutta Longitudinal, the Brahmaputra Meridional, the Eastern Frontier—Section  $23^{\circ}$  to  $26^{\circ}$ , and the Assam Longitudinal. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.
- Do. IX. Electro-Telegraphic Longitude Operations executed during the years 1875-77 and 1880-81, by Lieut.-Colonel W. M. Campbell, R.E., and Major W. J. Heaviside, R.E. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1883.

---

Synopses of the Results of the Great Trigonometrical Survey of India, comprising Descriptions, Co-ordinates, &c., of the Principal and Secondary Stations and other Fixed Points, of the Several Series of Triangles, as follows;—

- Volume I. The Great Indus Series, or Series *D* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. II. The Great Arc—Section  $24^{\circ}$  to  $30^{\circ}$ , or Series *A* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. III. The Karáchi Longitudinal Series, or Series *B* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.
- Do. IV. The Gurhágárh Meridional Series, or Series *F* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. V. The Rahún Meridional Series, or Series *E* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. VI. The Jogí-Tíla Meridional Series, or Series *G*, and the Sutelj Series, or Series *H* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.
- Do. VII. The North-West Himalaya Series, or Series *C* of the North-West Quadrilateral, and the Triangulation of the Kashmir Survey. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.

*List of Published Works of the Great Trigonometrical Survey of India—(Continued).*

Synopses of the Results of the G. T. Survey of India, &c.—(Continued).

- Volume VIII. The Great Arc—Section  $18^{\circ}$  to  $24^{\circ}$ , or Series *A* of the South-East Quadrilateral.  
By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Superintendent of the Survey,  
and his Assistants. Dehra Dún, 1878.
- Do. IX. The Jabalpur Meridional Series, or Series *E* of the South-East Quadrilateral.  
By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and  
Superintendent of the Survey, and his Assistants. Dehra Dún, 1878.
- Do. X. The Bider Longitudinal Series, or Series *D* of the South-East Quadrilateral.  
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of  
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XI. The Biláspur Meridional Series, or Series *F* of the South-East Quadrilateral.  
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of  
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XII. The Calcutta Longitudinal Series, or Series *B* of the South-East Quadrilateral.  
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of  
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XIII. The East Coast Series, or Series *C* of the South-East Quadrilateral. By Major-  
General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and  
Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XIV. The Budhon Meridional Series, or Series *J* of the North-East Quadrilateral.  
By Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General  
of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1883.
- Do. XV. The Rangír Meridional Series, or Series *K* of the North-East Quadrilateral.  
By Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General  
of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1883.

March, 1883.







## G. T. SURVEY OF INDIA



பி. ஏ. ச. சுவாமிநாதன், இயை.

SYNOPSIS OF THE RESULTS OF THE OPERATIONS OF  
**THE GREAT TRIGONOMETRICAL SURVEY OF INDIA**  
VOLUME XVII.

---

DESCRIPTIONS AND CO-ORDINATES  
OF THE

PRINCIPAL AND SECONDARY STATIONS AND OTHER FIXED POINTS OF

**THE GURWANI MERIDIONAL SERIES**

*OR SERIES N*

**AND THE GORA MERIDIONAL SERIES**

*OR SERIES O*

OF THE

**NORTH-EAST QUADRILATERAL.**

---

BY LIEUT.-GENERAL J. T. WALKER, C.B., R.E., F.R.S., &c., &c.,  
SURVEYOR GENERAL OF INDIA, AND SUPERINTENDENT OF THE TRIGONOMETRICAL SURVEY,  
AND HIS ASSISTANTS.



Dehra Dun:

PRINTED AT THE OFFICE OF THE TRIGONOMETRICAL BRANCH, SURVEY OF INDIA.

B. V. HUGHES.

1883.



# CONTENTS.



|                                         |    |    |    |                    |
|-----------------------------------------|----|----|----|--------------------|
| DIAGRAM OF THE NORTH-EAST QUADRILATERAL | .. | .. | .. | Facing title page. |
| ERRATA ET ADDENDA                       | .. | .. | .. | v                  |
| REFERENCES                              | .. | .. | .. | vi                 |
| PREFACE                                 | .. | .. | .. | vii                |

## *GURWANI MERIDIONAL SERIES.*

|                                                                                                       |    |     |    |    |    |    |        |
|-------------------------------------------------------------------------------------------------------|----|-----|----|----|----|----|--------|
| Introduction                                                                                          | .. | ... | .. | .. | .. | .. | iii—N. |
| Alphabetical List of Principal Stations                                                               | .. | ..  | .. | .. | .. | .. | 1—N.   |
| Numerical do. do.                                                                                     | .. | ..  | .. | .. | .. | .. | 2—N.   |
| Description of Principal Stations                                                                     | .. | ..  | .. | .. | .. | .. | 3—N.   |
| Addendum to Description of Principal Stations                                                         | .. | ..  | .. | .. | .. | .. | 9*—N.  |
| Principal Triangles                                                                                   | .. | ..  | .. | .. | .. | .. | 9—N.   |
| Secondary Triangles connecting Principal-Auxiliary Stations and Intersected Points                    | .. | ..  | .. | .. | .. | .. | 12—N.  |
| „ Jaunpur Series                                                                                      | .. | ..  | .. | .. | .. | .. | 21—N.  |
| „ Oudh Series                                                                                         | .. | ..  | .. | .. | .. | .. | 22—N.  |
| Azimuths of Surrounding Stations and Points, at Principal, Principal-Auxiliary and Secondary Stations | .. | ..  | .. | .. | .. | .. | 23—N.  |
| Co-ordinates and Descriptions of all Stations and Points                                              | .. | ..  | .. | .. | .. | .. | 32—N.  |
| Supplementary List of Co-ordinates and Description of Stations and Points                             | .. | ..  | .. | .. | .. | .. | 47—N.  |
| CHART                                                                                                 |    |     |    |    |    |    |        |

## *GORA MERIDIONAL SERIES.*

|                                         |    |    |    |    |    |    |        |
|-----------------------------------------|----|----|----|----|----|----|--------|
| Introduction                            | .. | .. | .. | .. | .. | .. | iii—O. |
| Alphabetical List of Principal Stations | .. | .. | .. | .. | .. | .. | 1—O.   |
| Numerical do. do.                       | .. | .. | .. | .. | .. | .. | 2—O.   |

*GORA MERIDIONAL SERIES*—(Continued).

|                                                                                                                  | PAGE. |
|------------------------------------------------------------------------------------------------------------------|-------|
| Description of Principal Stations .. .. .                                                                        | 3—0.  |
| Addendum to Description of Principal Stations .. .. .                                                            | 9*—0. |
| Principal Triangles .. .. .                                                                                      | 9—0.  |
| Secondary Triangles connecting Principal-Auxiliary Stations and Intersected Points ..                            | 12—0. |
| Azimuths of Surrounding Stations and Points, at Principal, Principal-Auxiliary and Secondary<br>Stations .. .. . | 16—0. |
| Co-ordinates and Descriptions of all Stations and Points .. .. .                                                 | 20—0. |

CHART

# ERRATA ET ADDENDA.

PAGE

VII—*N.*

*After* last para. but one from bottom *Add* Subsequently, in October 1848, a party of the Huriláong Meridional Series determined the course of the Ganges River further eastwards to Chunar. This triangulation was executed by Mr. G. W. Armstrong working on one bank with a 12-inch, and Mr. G. Terry on the other bank with a 7-inch theodolite: it emanated from Bindbáchal s. (Ganges River No. 47 s.) and closed on the side Murli h.s. to Chunar Fort Flagstaff; between the finally determined position-values of which the triangulation has been adjusted. Besides fixing the position of some permanent temples and buildings on both sides of the river, the operation also determined several important points in Mirzapur. The results have for convenience been exhibited in the Synoptical Volume of the Gurwáni Meridional Series: they will be found included in the Supplementary Co-ordinate List.

- 33—*N.* Batawa Building. *Note.*—Since this Volume was passed through the press it has been discovered that this point is identical with Batauwa Bungalow in the Supplementary Co-ordinate List, and the data given for Batauwa Bungalow on page 47—*N.* are to be preferred as more accurate.
- 35—*N.* line 1, col. 2 *for* Ganges River No. 7 s. *read* Ganges River No. 7\* s.
- „ at bottom of page *Add* footnote as follows:—\* The preceding portion of this triangulation will be found in the Co-ordinate List of the Karára Meridional Series, Synoptical Vol. XVI.
- 37—*N.* line 1, col. 2 *for* Ganges River No. 49 s. *read* Ganges River No. 49\* s.
- „ at bottom of page *Add* footnote as follows: \* The continuation of this triangulation will be found in the Supplementary Co-ordinate List, page 48—*N.*
- 42—*N.* Mirzapur Court House. *Note.*—Since this Volume was passed through the press it has been found that this point is identical with Ganges River No. 55 s. in the Supplementary Co-ordinate List, and the data given on page 48—*N.* are to be preferred as more accurate.

## GORA MERIDIONAL SERIES.

- 20—*O.* in description of Bahradal Hill Mark *for* Dadhi *read* Dúdhi
- 31—*O.* Rámgarh Temple. *Note.*—Since this Volume was passed through the press it has been discovered that this point is identical with a similarly named point in the Supplementary Co-ordinate List of the Gurwáni Series, and the data as furnished in the latter are to be preferred as being more accurate.

## REFERENCES.



The abbreviations employed in the text are as follows:—

h.s. denotes hill station secondary

s. „ station secondary

These abbreviations are only placed after stations where a theodolite has been set up and observations taken to surrounding points.

The latitudes and longitudes of all points shown on the Chart at the end of each series will be found in the text. The latter exhibits numerical values of triangles only to points of a superior class, to which alone, if exhibited on the Charts, lines are drawn: the lines are either continuous throughout, or dotted for half the length and continuous for the other half: the dots indicate that the bearing was not observed, and in such cases numerical values of azimuths are not given. For other points, difficult to identify or of comparatively less accuracy, numerical values of triangles or azimuths are not given.

*March, 1883.*

W. H. COLE,

*In charge of Computing Office.*



# PREFACE.

The Gurwáni and the Gora Meridional Series are the fifth and the sixth meridional series from the west of the sixteen chains of triangles included in the Section of the Principal Triangulation of the Survey of India which has been named the North-East Quadrilateral. This Section embraces the area within the Meridians of  $78^{\circ}$  and  $92^{\circ}$  and the Parallels of  $23^{\circ}$  and  $30^{\circ}$ ; and for reasons explained in Section 7 of Chapter I of Volume II of the *Account of the Operations of the Great Trigonometrical Survey*, its general reduction was postponed till that of the neighbouring Quadrilaterals, viz., the North-West and South-East, had been completed, whereby two of the Series, the Great Arc, Section  $24^{\circ}$  to  $30^{\circ}$ , and the Calcutta Longitudinal, entering the periphery of the North-East Quadrilateral, became finally fixed. The general principles of the Simultaneous Reduction, and the procedure followed in carrying it out, are the same as have been explained in Volume II of the *Account of the Operations, &c.*, and full details of the whole of the principal triangulation which is at present included in the Quadrilateral, will be found in Volumes VII and VIII of the *Account of the Operations, &c.*

As however the entire contents of the volumes of the principal triangulation are not needed by geographers and surveyors, and moreover as these volumes give no details of the secondary triangulation—which is of considerable value for local requirements—it is obviously desirable that synopses of the final results of the whole of the operations, including the secondary as well as the principal triangulations, should be published for general use, in such a form as to be most suitable for convenience of reference. This has already been done as follows;—

- I. Great Indus Series.
- II. Great Arc, Section  $24^{\circ}$  to  $30^{\circ}$ .
- III. Karáchi Longitudinal Series.
- IV. Gurhāgarh Meridional Series.
- V. Rahún Meridional Series.
- VI. Jogí-Tíla and Sutlej Series.
- VII. North-West Himalaya Series.

For those forming the South-East Quadrilateral,

- VIII. Great Arc, Section  $18^{\circ}$  to  $24^{\circ}$ .
- IX. Jabalpur Meridional Series.
- X. Bider Longitudinal Series.
- XI. Biláspur Meridional Series.
- XII. Calcutta Longitudinal Series.
- XIII. East Coast Series.

And for the following Series of the North-East Quadrilateral,

- XIV. Budhon Meridional Series.
- XV. Rangir Meridional Series.
- XVI. Amua and Karúra Meridional Series.

Already published.

The present is the 17th Synoptical Volume and the fourth of those appertaining to the North-East Quadrilateral; and it has been made to include both the Gurwáni and the Gora Meridional Series, partly because portions of the same districts enter both series and it is therefore convenient to have all the results in one volume, and partly because the available matter is insufficient for two volumes.

It gives the results of the whole of the triangulation executed in connection with these series, both the principal, which was executed with theodolites having azimuthal circles of 15, 18 and 24 inches in diameter read by 3 and 5 micrometer microscopes, and the secondary, which was executed with smaller theodolites read by verniers.

By the process of reduction which has been followed the principal triangulation has been rendered perfectly consistent, both internally and externally; internally, so that if in any one of the several polygonal figures of which the chains may be composed, calculations are carried from one station to another in every possible direction, the same results will be inevitably deduced; and externally, so that the values of the co-ordinates of any station, when computed from the given co-ordinates of any other station, with the final linear and angular data, will be the same, whether the calculation is carried directly through the series, or circuitously through any of the other chains of triangles comprising the North-East Quadrilateral. All secondary triangulations which emanate from one side of the principal series and close on another side thereof, or on a contiguous series, have also been made consistent throughout.

As regards the general arrangement of this volume, it is necessary to point out that the several sections have been prepared and printed at different times, and that the work has extended over several years. The Introductions to each series and the Names and Descriptions of the Principal Stations were originally prepared for Volume VIII of the *Account of the Operations, &c.*, and when a sufficient number of copies had been printed for that work, additional copies were struck off for the present Synopsis. The Alphabetical and Numerical Lists of Principal Stations, pages 1—*N*, and 2—*N*, and 1—*O*, and 2—*O*, as well as the Names and Descriptions of the Principal Stations of the Gora Series, pages 3—*O*, to 8—*O*, were printed prior to the year 1868, when the general programme for the final reduction of the whole of the Triangulation of India was drawn up; there was then a long pause in the printing, while the Simultaneous Reductions of the North-West, South-East and North-East Quadrilaterals were being completed; this was done by the year 1877, when the secondary triangulation was adjusted in accordance with the principal, and then the printing of this volume was resumed.

The paging of each series starts from unity and is therefore not continuous throughout this volume. This was necessitated by the order of routine which had to be adopted in printing the successive subjects embraced in each and which is the same for all. The paging of each series is however distinguished by using a capital letter as a subscript to the numerals; thus all the paging which has reference to the Gurwáni Meridional Series has the subscript *N*, and that to the Gora Meridional Series the subscript *O*.

The data given in this volume are the following:—

*First* (pages 1—*N*, 1—*O*), alphabetical lists of the names of the principal stations, showing the numbers assigned to them, which were employed in the reductions as being more convenient to use than names.

*Second* (pages 2—*N*, 2—*O*), numerical lists giving the names corresponding to the numbers.

*Third* (pages 3—*N*, 3—*O*), descriptions of the principal stations—of their structure and positions—as taken from the original records of the observations, and supplemented by Addenda (pages 9\*—*N*, 9\*—*O*) giving the most recent information of their condition which has been received up to date.

*Fourth* (pages 9—*N*, 9—*O*), the angles and sides of the principal triangles, numbered and arranged in order from south to north.

*Fifth* (pages 12—*N*, 12—*O*), the angles and sides of certain secondary triangles. The numbering is here made consecutive to that of the principal triangles, in order to facilitate references which are made in other sections to the place where the length of a side is to be found.

*Sixth* (pages 23—*N*, 16—*O*), the azimuths of surrounding stations and points, at principal, principal-auxiliary, and secondary stations, the latter arranged in alphabetical order.

*Seventh* (pages 32—*N*, 20—*O*), the co-ordinates and descriptions of all stations and points arranged in alphabetical order.

The heights of the stations of the Gurwáni Meridional Series depend in the first instance on the finally determined values of the stations of Chapri and Pokra of the Calcutta Longitudinal Series (of the South-East

Quadrilateral), and on the spirit-leveled height of Saibara of the North-East Longitudinal Series, whilst those of the Gora Meridional Series depend on the finally determined values of the stations of Gora and Sewádhi of the Calcutta Longitudinal and on the spirit-leveled height of Gharbaria and on the fixed height of Dharamsingua of the North-East Longitudinal Series. In addition to these fixed heights, the heights of Stations VII, VIII, XXII, XXIV and XXV of the Gurwáni Meridional Series, and the heights of Stations VIII, IX, X, XII, XIV, XV, XVII, XVIII, XX, XXII, XXIV and XXVI of the Gora Meridional Series were determined by the Spirit-leveling Operations of this Branch of the Department, and those of Stations XIX and XXIII of the former series were determined by similar operations of the Revenue Branch. The manner in which the heights of the remaining stations have been made to accord with those above designated, is explained in Section 7 of Chapter II, Part I of Volume VII of the *Account of the Operations, &c.* The datum to which all heights have been referred is the mean sea level of Karáchi (Kurrachee). It may be here stated that all trigonometrically determined heights invariably refer to the upper surfaces of the central masonry pillars which are constructed for the instruments to stand on. Spirit-leveled values sometimes refer to the upper surface and sometimes to the basement of the pillar, whichever the leveling staff was set on; a description of the exact point referred to is given in each instance in footnotes to the pages of the Co-ordinate Lists, commencing on pages 32—*N.* and 20—*O.* respectively.

It has not been considered necessary to publish the whole of the details of the secondary triangulation, portions having been executed originally for preliminary geographical purposes, to facilitate the construction of a first map of India, and the objects observed having in many instances been flags and temporary marks which must long since have disappeared. The sides and angles of 264 triangles for the Gurwáni Meridional Series and of 80 triangles for the Gora Meridional Series, which were selected as most likely to be still in existence and of future use, and the azimuths of all these sides, have been given; but for a number of other points the co-ordinates only have been given. With the aid of Nos. X, XI and XII of the *Auxiliary Tables to facilitate calculations of the Survey Department of India*, Dehra Doon 1868, local surveyors, working on a system of rectangular co-ordinates, can readily transform the spheroidal co-ordinates here given to suit their own requirements.

The Longitudes depend on an astronomically determined value of the longitude of the Madras Observatory,  $80^{\circ} 17' 21''$ , which was deduced about the year 1815. There has long been reason to believe that this value was about 3' too great; but, pending the final determination of the longitude of the Madras Observatory, it has not been considered desirable to alter the value, which has therefore been maintained up to the present time. An electro-telegraphic determination of the longitude of Madras from Greenwich, commencing with the difference between Suez and Greenwich—determined, in 1874, under the superintendence of the Astronomer Royal—was completed in 1877 by the determination of the difference between Suez and Madras, by Captains Campbell and Heaviside, as a part of the operations of this Survey. The combined result places the Observatory at Madras in Long.  $5^{\text{h}} 20^{\text{m}} 59^{\text{s}}.42 = 80^{\circ} 14' 51''.30$ . Thus the following precept may be accepted with considerable confidence,—

**All the values of longitude in this volume require a constant correction,  
probably of  $-2' 30''$ .**

As regards the orthography of Indian names in the present volume. The Alphabetical and Numerical Lists of Principal Stations, at the commencement of the volume, were printed before the year 1868, in accordance with the rules introduced by Colonel Everest for use in the Survey Department. Subsequently, in 1874, several provincial lists of spellings, constructed under the immediate orders of the Government of India, were received; and thereafter the newly authorised spellings were adopted for all names and other words contained in these lists; but for words for which there was no specific authority, the spellings have been framed in accordance with the methods followed in the preparation of the published lists, reference being made in the present instance more particularly to the Gazetted Lists for the North-West Provinces and Oudh. As a general rule the pronunciations of the vowels are as follows:—*a* has a variable sound as in woman, rural, paltry; *á* as in tartan; *i* as in bit; *í* as in ravine; *u* as in bull; *ú* as in rural; *o* as in note; *e* as *a* in say; *au* as *ou* in cloud; *ai* as *i* in ride.

The Charts accompanying this volume show the whole of the principal stations and triangulation, the positions of all the secondary points, and those portions of the secondary triangulations of which full details of the

angles, sides and azimuths are given. With the aid of the Charts it is hoped that little difficulty will be met with in finding out any of the data which may be required. The descriptions of the secondary stations are in some cases not as full and clear as is to be desired: this arises from the inadequacy of the information entered on the spot by the surveyors in their field books; every effort has been made to supplement the field books, whenever it was found practicable to do so, in order to facilitate the future identification of the stations; all the information which is forthcoming has now been given.

The general arrangement of this volume and the preparation of the data which it contains have been the work, at different times, of Mr. Hennessey, M.A., F.R.S., Major Herschel, R.E., F.R.S., and Mr. Cole, M.A. Major Herschel moreover supervised the Simultaneous Reduction of the North-East Quadrilateral of which these Series form a portion, while the Introductions to them were written by Colonel B. R. Branfill. Great pains have been taken to secure the utmost accuracy in preparing the data and passing them through the press.

(for GENERAL J. T. WALKER)

DEHRA DUN, }  
March, 1883. }

J. B. N. HENNESSEY,

*Offg. Dy. Surveyor General,*

*In charge Great Trigonometrical Survey of India.*

**GURWANI MERIDIONAL SERIES.**



GURWANI MERIDIONAL SERIES—(LONG.  $82^{\circ} 20'$ ).

## INTRODUCTION.

In the Autumn of 1844 the Hon'ble Court of Directors of the East India Company expressed a desire that the Gurwáni Meridional Series, the next in order east of the Karára Meridional Series, should be taken up and completed as soon as possible, together with the other alternate series adjacent, which had been omitted, or purposely deferred in the first instance, as these series were now urgently needed for the completion of the Atlas of India.

Accordingly in August 1845, when reporting the completion of the Karára Series, the Surveyor General, then Captain A. S. Waugh, Bengal Engineers, stated to the Government that he purposed employing the two parties that had been engaged in that work, upon the Gurwáni and the East Coast Series, assigning the former to the party under Captain J. S. Du'Vernet.

The Series was begun towards the end of 1845, and successfully brought to a conclusion in two seasons by the 24th of May 1847 by this officer and his assistants.

The Gurwáni Meridional Series was so called because it was carried along the meridian of Gurwáni Hill Station (of the Calcutta Longitudinal Series), at which the initial Azimuth of the Series was observed. Its linear and other geodetic values were derived in the first instance from those of the side Chapri-Pokra of the Calcutta Longitudinal Series, in the Native State of Rewah (Lat.  $24^{\circ} 19'$ ), whence it extends northwards in a single series of thirty-two triangles along the meridian of  $82^{\circ} 20'$  to the side Saibara-Bansídila of the North-East Longitudinal Series in the Gonda district of Oudh, N.W. Provinces, in Lat.  $27^{\circ} 26'$ , a total distance of 211 miles, traversing the districts of Mirzapur, Allahabad, Jaunpur, Partabgarh, Sultanpur, Fyzabad, and Basti. The six southernmost stations lie in the hilly tract of the Kaimúr range and its outliers south of the Ganges midway between Allahabad and Mirzapur, about the Son (Soane) river.

The rest of the Series lies wholly in the plains for about 160 miles, crossing the rivers Ganges, Gumti, and Gogra (Ghágra), and consists of 26 tower stations averaging 25 feet in height, the rays between each pair of which required to be laboriously traced and cleared.

Concurrently with the principal triangulation a great many secondary stations and landmarks were fixed, and many villages and points of a tertiary order determined for topographical or geographical purposes.

The positions of the important towns of Allahabad, Mirzapur, Jaunpur, Fyzabad, and Oudh (Ajodhya) were determined, the course of the river Ganges laid down for a distance of

95 miles, and some years subsequently that of the Gogra or Sarju for about 70 miles in a direct line.

Having suffered severely from jungle fever, contracted whilst finishing the northern

*Season 1845-46.*

PERSONNEL.

Captain J. S. Du'Vernet, 1st Assistant.  
Mr. J. Mulheran, Senior 1st Class Sub-Assistant.  
" W. Glynn, Junior " "  
" F. C. Blewitt, 3rd Class "

part of the Karára Series, Captain Du'Vernet was sent away on sick leave to the Mussooree Hills for three months during the recess of 1845, and only returned to the Surveyor General's head quarters at Allahabad on 15th September when he received charge of the Gurwáni Series. Before the end of the month he had despatched his assistants to com-

mence the preliminary operations, but he himself remained in the Surveyor General's Office at Allahabad on account of his health till the middle of October. Meanwhile the Surveyor General proceeded with a portion of the party to Sora T.S. of the Karára Meridional Series; here he observed an astronomical Azimuth and took a series of observations to test the merits of the 18-inch theodolite by Saiyad Mir Mohsin† in use with this party, which shewed that the angles measured with this instrument were liable to peculiar errors, apparently of graduation, to eliminate which needed special precautions.

On the 18th October Captain Du'Vernet proceeded to superintend the laying out of the Gurwáni Series, and by the middle of December the approximate series throughout the hilly tract being complete, commenced the final observing by taking an astronomical Azimuth at Gurwáni, which was successfully finished by the 2nd of January 1846. He then proceeded to observe at the undermentioned hill stations in the following order:—Chapri (XXIX)\*, Pokra (XXXI)\*, Murchia (I), Kasda (II), Jamaura (III), Katra (IV), Tikor (V), and Meja (VI), completing the Series south of the Ganges by the 9th March, after which he connected the secondary series for laying down the course of the river between Allahabad and Mirzapur, and then continued the final observations at the following tower stations, north of the river:—Barápur (VII), Ganeshpur (VIII), Marár (XI), Seona (IX), and Birua (X), taking a set of star observations for Azimuth at Marár, between the 3rd and 19th of April, after which he went into recess quarters at Allahabad on the 5th of May.

The out-turn of work completed this first season consisted of eleven new principal stations (five of them towers) selected, built, and finally observed at; extending the Series to Marár (XI) 94 miles north of its origin by a single series of 11 large symmetrical triangles, two astronomical Azimuths, and a large proportion of secondary triangulation, which will be noticed in detail hereafter.

The principal observations hitherto, were made with Saiyad Mir Mohsin's 18-inch theodolite† which Captain Du'Vernet had previously used in the North-East Longitudinal, and in the Karára Series. But in view of the liability to error detected in this instrument, abovementioned, it was now discarded and has not again been used.

Before taking the field for the ensuing season 1846-47, the 24-inch theodolite (No. 1) designed by Captain Waugh‡, with five horizontal micrometers instead of three, was issued for

\* Of the Calcutta Longitudinal Series.

† For a description of this instrument see page 67 of the Appendices to Vol. II.

‡ For a description of this instrument see pages 55 to 57 of the Appendices to Vol. II.



use, and all the remaining principal angles of the Gurwáni Series were measured by it; and, although more than half the former season's triangulation lay in the hills, whilst that of the next season lay in the plains, with tower stations throughout, and presumably worse rays and signals, the average triangular error was reduced from 2".2 to 1".3.

The party took the field about the middle of October, and, leaving the big theodolite in store at Allahabad, proceeded to complete the approxi-

Season 1846-47.

PERSONNEL.

Captain J. S. Du'Vernet, 1st Assistant.  
Mr. J. Mulheran, 1st Class Sub-Assistant.  
" T. Olliver, " (vice  
" W. Glynn resigned).  
" F. C. Blewitt, 3rd Class "

mate series, from the point at which the principal observations had been concluded the previous season. This proved a more difficult task than had been anticipated, owing to the swampy and wooded state of the country. The clearing of each 11- or 12-mile ray occupied nearly a week, an unusually slow rate of progress for the Officers engaged on

this Series; but with perseverance, good arrangements, and good fortune, the towers were built, and the rays cleared in time for the principal observations to be begun soon after the middle of February 1847.

Captain Du'Vernet himself took part in the approximate series, working northwards until the Series was well advanced towards its terminus, when he retraced his steps about the middle of December, inspecting the tower-building and ray-clearing in progress, on his way to get the big theodolite, with which he returned to Bisaul (XXIII), his first station for the final observations, by the middle of January. Here he observed an astronomical Azimuth to  $\lambda$  Ursæ Minoris at both elongations, between 20th January and the 5th of February. This done, he took up the final observations to the northward first, in the district of Gonda, in order to get away from that unhealthy part of the country as early as possible, and completed the work with the 24-inch theodolite at the undermentioned tower stations as follows:—

|             |          |         |          |      |     |          |      |
|-------------|----------|---------|----------|------|-----|----------|------|
| at Bisaul   | (XXIII)  | between | January  | 19th | and | February | 23rd |
| „ Kumeria   | (XXV)    | „       | February | 26th | „   | March    | 3rd  |
| „ Sabanjot  | (XXVII)  | „       | March    | 4th  | „   | „        | 6th  |
| „ Mánapára  | (XXIX)   | „       | „        | 8th  | „   | „        | 13th |
| „ Bansídila | (XLV)†   | „       | „        | 14th | „   | „        | 15th |
| „ Saibara   | (XLIII)† | „       | „        | 16th | „   | „        | 17th |

the two last forming the terminal side of this Series on the north. He now returned southwards and continued the final observing without interruption, as follows:—

|              |          |         |       |      |     |       |                     |
|--------------|----------|---------|-------|------|-----|-------|---------------------|
| at Gurúnagar | (XXX)    | between | March | 19th | and | March | 21st                |
| „ Kopa       | (XXVIII) | „       | „     | 22nd | „   | „     | 24th                |
| „ Mánapára   | (XXIX)   | „       | „     | 25th | „   | „     | 26th (second visit) |
| „ Tikeria    | (XXVI)   | „       | „     | 27th | „   | „     | 30th                |
| „ Orejhár    | (XXIV)   | „       | April | 1st  | „   | April | 4th                 |

† Of the N.E. Longitudinal Series.

|            |         |               |      |           |      |                |
|------------|---------|---------------|------|-----------|------|----------------|
| at Bisaul  | (XXIII) | between April | 7th  | and April | 9th  | (second visit) |
| „ Ráhet    | (XXII)  | „             | 10th | „         | 11th |                |
| „ Nansa    | (XXI)   | „             | 12th | „         | 13th |                |
| „ Rarauli  | (XX)    | „             | 18th | „         | 20th |                |
| „ Sirwára  | (XVIII) | „             | 21st | May       | 2nd  |                |
| „ Dopáp    | (XVII)  | May           | 3rd  | „         | 6th  |                |
| „ Newa     | (XVI)   | „             | 7th  | „         | 9th  |                |
| „ Saifabad | (XV)    | „             | 10th | „         | 14th |                |
| „ Parípura | (XIV)   | „             | 15th | „         | 17th |                |
| „ Newáda   | (XIII)  | „             | 18th | „         | 19th |                |
| „ Rámapura | (XII)   | „             | 19th | „         | 21st |                |
| „ Marár    | (XI)    | „             | 22nd | „         | 23rd |                |
| „ Birua    | (X)     | „             | 23rd | „         | 25th |                |

This was an uncommonly good season's work consisting of twenty-one tower stations in a low, flat, and swampy country, forming a single chain of triangles by which the Series was carried to its terminus, a distance of 120 miles on the meridian, covering an area of some 1200 square miles of thickly inhabited country, besides a large amount of secondary triangulation by which the position of a great number of places was duly fixed \*.

On the completion of the Simultaneous Reduction of the North-East Quadrilateral, it was found that the following errors had been actually dispersed over the Gurwáni Series, between its origin Chapri-Pokra of the Calcutta Longitudinal Series, and its terminus, Saibara-Bansídila of the North-East Longitudinal Series:—

In Logarithm of the side —  $0.0000162,2 = - 2.38$  inches per mile.

„ Azimuth „ +  $1''.317$

„ Latitude of Bansídila —  $0.312$

„ Longitude „ —  $0.210$

The heights of the Gurwáni Series were computed in the first instance from the trigonometrical values of the side of origin Chapri-Pokra northwards to the terminal side Saibara-Bansídila. Subsequently, the height above mean sea level of eight stations of the Series (VII, VIII, XIX, XXII, XXIII, XXIV, XXV, and Saibara) was determined by the spirit-leveling operations of the department; these shew that the trigonometrical height of Barípur (VII) was erroneous by — 10.2 feet, that of Kumeria (XXV) by — 13.2 feet (the maximum cumulative error disclosed throughout the Series, 211 miles in length), and that of the closing station Saibara by — 11.6.

The largest error detected here by the spirit-leveling, on any line between adjacent stations, amounted in one instance (between Barípur and Ganeshpur) to 5.3 feet.

The actual corrections which were made eventually to the trigonometrical heights of the thirty-two stations of the Series, to make them correspond with the spirit-leveled values, averaged 5 feet to each of the eight southernmost stations, extending for a distance of 68

---

\* "Thus finishing the Gurwáni Series in the unprecedented short space of two seasons—a brilliant achievement reflecting the highest credit on Captain Du'Vernet and his party". Quotation from Surveyor General's Progress Report for the year ending 1st October 1847.

miles from the side of origin to the first spirit-leveled check, and 3 feet to each of the remaining twenty-four stations, extending over a distance of 143 miles, checked by spirit-leveled points at intervals of 70, 32, and 41 miles, up to the terminal station, Saibara. For further particulars regarding this dispersion of error in the trigonometrical leveling, see page 39 of Part I of Volume VII of the *Account of the Operations of the Great Trigonometrical Survey of India*.

### *Secondary Triangulation.*

A very large amount of secondary triangulation was done by the Gurwáni Series party, especially in the hilly tract to the south of the Ganges, and in the populous districts of Allahabad, Mirzapur and Jaunpur.

In the *first* place a great number of points were observed by Captain Du'Vernet with the large theodolite from the hill stations, whilst conducting the operations in 1845-46, south of the Ganges, supplemented by observations made at the points with a small theodolite. This fixed amongst others the position of Mirzapur Church.

*Secondly.* A great extension of the secondary triangulation was made, especially on the west flank, by Mr. Mulheran with a 12-inch theodolite, in the tract of country above mentioned.

*Thirdly.* The ray-trace surveys were utilized for determining the landmarks and places that were observed *en route*.

*Fourthly.* A minor series was carried from Birua T.S. (X) to Allahabad by Mr. Mulheran with a 12-inch theodolite, for the purpose of determining the position of a number of new points or landmarks in and about Allahabad, in addition to those which had already been laid down from the two adjacent principal stations of the Karára Series, Bagála and Singraur. As the stations of this triangulation were not permanently marked and are therefore not likely now to be found, the usual details of the triangles are not published, but only the latitudes and longitudes of the stations and permanent points whose positions were determined.

*Fifthly.* A ray-trace triangulation was carried during the recess season of 1846 by Mr. Mulheran with a 12-inch theodolite, a distance of 22 miles, from Allahabad Church to Bagála T.S., along the river Jumna; this also checked a number of points which had been previously observed by Captain Shortrede, whilst conducting the final operations of the Karára Series, in the account of which series, mention of this work is made.

*Sixthly.* A minor series was carried in 1845-46 by Mr. Glynn with a 12-inch theodolite, a distance of 50 miles in a direct line, along the river Ganges, fixing 95 miles of its tortuous course, from Mirzapur to Jhúsi (at the junction of the rivers Ganges and Jumna), which, with another point (Moia), had also been determined by triangulation appertaining to the Karára Series.

*Seventhly.* A ray-trace triangulation was run along the river Ganges from Allahabad Church to Singraur T.S., both belonging to the Karára Meridional Series, in the account of which this work will be found mentioned. It was done by Mr. Glynn with a 12-inch theodolite in August 1846.

So far the abovementioned secondary work was done in the season of 1845-46, Messrs. Mulheran and Glynn remaining in the field during the summer recess of 1846.

As but few points could be observed directly from the principal stations in the plains to the north of the Ganges, and the entire strength of the party was concentrated on the principal triangulation, the amount of secondary points fixed during the second season is far below that of the first season's work; nevertheless the chief towns and villages in the vicinity of the principal stations were fixed, and the secondary operations may be summarized as follows, consecutively with those before mentioned.

*Eighthly.* As soon as his work on the approximate series was finished, Mr. Mulheran carried a minor series with a 12-inch theodolite, 27 miles eastward from the side Marár-Newáda of the main series, to Jaunpur, by which a number of permanent buildings in and about that city were fixed.

*Ninthly.* Some minor triangulation was done, principally with a 7-inch theodolite, in and about the ancient city of Oudh (Ajodhya) and its modern successor Fyzabad, by which the chief landmarks were fixed, and also some buildings along the banks of the river Gogra or Sarju.

*Tenthly.* For topographical purposes, the position of 257 villages was determined in the course of the two seasons' work under notice, by observations made to them with the theodolite from one station, the distance being measured by the perambulator. As these determinations were only approximate they do not find a place in the Synoptical Volume of this Series.

In addition to the foregoing, an extensive chain of minor triangles appears on the chart of the Series along the river Gogra. This minor triangulation crosses the Gurwáni Series along the side Bisaul-Orejhár (XXIII-XXIV) with which it is connected. It was done six years subsequently, in 1852-53, by Mr. Belletty with a 12-inch theodolite and a party detached from the Huríláong Series. The details of this work (the Gogra Minor Series), between its stations No. 113 and No. 165 are now published as a portion of the Gurwáni Series, after having been adjusted to fit in duly between the adopted position-values of the undermentioned principal stations, as follows:—

Nos. 113 to 135 between Barhiáchak of the Gora Series (the next meridional series to the eastward) and Bisaul of this (the Gurwáni) Series; Nos. 136 to 142 between Bisaul and Orejhár, both of this Series; and finally, Nos. 143 to 165, forming a part of the section fitted in between Orejhár and Mási of the N. E. Longitudinal Series.

June 1881.

B. R. BRANFILL.

---

## GURWANI MERIDIONAL SERIES.

## ALPHABETICAL LIST OF STATIONS.

|                                                   |         |                                                 |        |
|---------------------------------------------------|---------|-------------------------------------------------|--------|
| Bansídíla<br>(of North-East Longitudinal Series). | XLV.    | Murchía                                         | I.     |
| Barípúr                                           | VII.    | Nansa                                           | XXI.   |
| Birna                                             | X.      | Newa                                            | XVI.   |
| Bisaol                                            | XXIII.  | Newáda                                          | XIII.  |
| Chapri<br>(of Calcutta Longitudinal Series).      | XXIX.   | Orájar                                          | XXIV.  |
| Dopáp                                             | XVII.   | Parípúra                                        | XIV.   |
| Ganespúr                                          | VIII.   | Pokra<br>(of Calcutta Longitudinal Series).     | XXXI.  |
| Gurunagar                                         | XXX.    | Ráhet                                           | XXII.  |
| Jamaora                                           | III.    | Rámápúra                                        | XII.   |
| Kaprádi                                           | XIX.    | Raraoli                                         | XX.    |
| Kasda                                             | II.     | Sabánjot                                        | XXVII. |
| Katra                                             | IV.     | Saibara<br>(of North-East Longitudinal Series). | XLIII. |
| Kopa                                              | XXVIII. | Saifábád                                        | XV.    |
| Kumería                                           | XXV.    | Seona                                           | IX.    |
| Mánápára                                          | XXIX.   | Sirwára                                         | XVIII. |
| Marár                                             | XI.     | Tikería                                         | XXVI.  |
| Mega                                              | VI.     | Tikor                                           | V.     |

## GURWANI MERIDIONAL SERIES.

## NUMERICAL LIST OF STATIONS.

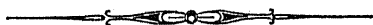
---

|      |   |   |   |                                               |        |   |   |   |   |                                                    |
|------|---|---|---|-----------------------------------------------|--------|---|---|---|---|----------------------------------------------------|
| XXIX | . | . | . | Chapri.<br>(of Calcutta Longitudinal Series). | XVI    | . | . | . | . | Newa.                                              |
| XXXI | . | . | . | Pokra.<br>(of Calcutta Longitudinal Series).  | XVII   | . | . | . | . | Dopáp.                                             |
| I    | . | . | . | Murchía.                                      | XVIII  | . | . | . | . | Sirwára.                                           |
| II   | . | . | . | Kasda.                                        | XIX    | . | . | . | . | Kaprádi.                                           |
| III  | . | . | . | Jamaora.                                      | XX     | . | . | . | . | Raraoli.                                           |
| IV   | . | . | . | Katra.                                        | XXI    | . | . | . | . | Nansa.                                             |
| V    | . | . | . | Tikor.                                        | XXII   | . | . | . | . | Ráhet.                                             |
| VI   | . | . | . | Mega.                                         | XXIII  | . | . | . | . | Bisaol.                                            |
| VII  | . | . | . | Barípúr.                                      | XXIV   | . | . | . | . | Orájar.                                            |
| VIII | . | . | . | Ganespúr.                                     | XXV    | . | . | . | . | Kumería.                                           |
| IX   | . | . | . | Seona.                                        | XXVI   | . | . | . | . | Tikería.                                           |
| X    | . | . | . | Birna.                                        | XXVII  | . | . | . | . | Sabánjot.                                          |
| XI   | . | . | . | Marár.                                        | XXVIII | . | . | . | . | Kopa.                                              |
| XII  | . | . | . | Rámápúra.                                     | XXIX   | . | . | . | . | Mánápára.                                          |
| XIII | . | . | . | Newáda.                                       | XXX    | . | . | . | . | Gurunagar.                                         |
| XIV  | . | . | . | Parípúra.                                     | XLV    | . | . | . | . | Bansídíla.<br>(of North-East Longitudinal Series). |
| XV   | . | . | . | Saifábád.                                     | XLIII  | . | . | . | . | Saibara.<br>(of North-East Longitudinal Series).   |

---

## GURWANI MERIDIONAL SERIES.

## DESCRIPTION OF PRINCIPAL STATIONS.



Of the 30 Principal Stations composing this Series, the 6 southernmost, as also the 2 initial stations, are on hills: each consists either of a solid platform (of rubble stone and earth) varying in height from 3 to 8 feet and carrying a mark at the upper surface corresponding with one or more marks below, or of a circular tower (of rubble stone and earth) enclosing a central solid pillar in which are inserted several mark-stones each carrying a circle and centre adjusted in the normal of the lowest which is at the base of the pillar. When the Series entered on the plains, suitable artificial elevations had to be constructed, as usual, to admit of overlooking the curvature of the earth. Each of these structures consisted of a circular earthen tower of about 20 feet diameter at base and 16 feet diameter at top, enclosing a central solid pillar of masonry. The pillars consisted of rectangular blocks of masonry about 8 or 10 feet in height, surmounting one another, each succeeding block being contracted, so as to leave a plinth of some 6 inches around its base: the uppermost block, for the theodolite to stand on, was made cylindrical; it had a diameter of about  $3\frac{1}{2}$  feet and was surrounded by a hollow annulus, so that it stood isolated from the tower on which the observatory tent was erected. In respect to mark-stones with the usual circle and central dot engraved, each pillar had one on its summit, besides generally another in its base, with one or more in addition fixed intermediately: also pairs of lines, intersecting one another in the normal through these central dots, were cut on the plinths or on the faces of the pillar, to provide the means of recovering the position of a dot in case of injury to the mark-stone on which it was engraved. An earthen staircase 4 feet wide and extending some 30 feet around the tower gave access to its summit, and the structure was further supported by a buttress of loose earth carried up to rather more than half its height.

The following descriptions have been compiled from those given in the MS. General Report and other original records of this Series, supplemented in respect to the neighbouring villages by information obtained from the Revenue and Topographical Survey maps of the country traversed. The information as to the local subdivisions in which the several stations occur has been derived from the latest Annual Reports received from the District Officers to whose charge the stations have been committed.

XXIX.—(*Of the Calcutta Longitudinal Series*). Chapri Hill Station, lat.  $24^{\circ} 19'$ , long.  $82^{\circ} 16'$ —observed at in 1828, 1846 and 1865—is on a small hill about  $1\frac{1}{2}$  miles S.W. of the village of Chapri: taluka Singrauli of the Rewah territories.

The pillar is solid and contains two marks, the upper 3.25 feet above the lower which is engraved on the rock *in situ*, having been placed there in 1828. The station was revisited in 1846 for the purpose of originating the Gurwani Meridional Series when no alteration appears to have been made. On again visiting it in 1865, the upper mark-stone of the former station was found undisturbed, but a new pillar was then built to the same height as before. The distances and bearings of the surrounding villages are:—Charki, 1 mile S.E.; Kanauli,  $2\frac{1}{4}$  miles S.S.W.; Marua, nearly 3 miles N.W. by W.; and Khursa,  $2\frac{1}{4}$  miles N. by W.

XXXI.—(*Of the Calcutta Longitudinal Series*). Pokra Hill Station, lat.  $24^{\circ} 19'$ , long.  $82^{\circ} 31'$ —observed at in 1828, 1846 and 1865—is on a conspicuous peak in the midst of a mass of hills densely covered with forest, and distant about 2 miles N.W. of the small village of Pokra: taluka Bardi of the Rewah territories.

The pillar is solid and contains two marks, the upper 2.92 feet above the lower which is engraved on a square cut stone imbedded in the earth. The station was revisited in 1846 for the purpose of originating the Gurwani Meridional Series, but no alteration in construction appears to have been then made. On again visiting it in 1865, the mark-stone of the former station was found undisturbed, but a new pillar was then built to the same height as before. The distances and bearings of the surrounding villages are:—Pariasi, about  $1\frac{1}{4}$  miles S.; Garwani,  $3\frac{1}{2}$  miles N.W.; and Pachwar,  $1\frac{1}{2}$  miles N.E.

I. Murchia (*Murchia*) Hill Station, lat.  $24^{\circ} 35'$ , long.  $82^{\circ} 23'$ —observed at in 1846—is situated on a rocky eminence (so called) of the Kaimur range which overhangs the Son river and forms its northern watershed; it stands on the lands of the village of Jeraulia: pargana Rewah of the Rewah territories.

The station consists of a platform (of rubble stone and earth) 8.2 feet high and about 14 feet in diameter; it has a mark engraved on the rock *in situ*, a mark-stone fixed in its upper surface, and two others inserted in it at 6.8 and 7.7 feet respectively above the lowest mark. The distances and bearings of adjacent places are:—Parsia, from which there is an easy road to the station, about 3 miles N.; Khairi-Ghat, the only pass in this vicinity which is practicable for laden animals,  $1\frac{1}{2}$  miles W.N.W.; and Dhakor village,  $1\frac{1}{4}$  miles S. by E.

II. Kasda Hill Station, lat.  $24^{\circ} 34'$ , long.  $82^{\circ} 39'$ —observed at in 1846—is situated on a rocky eminence of the Kaimur range which overhangs the Son river and forms its northern watershed: tahsil Bardi of the Rewah territories.

The station consists of a platform (of rubble stone and earth) 9 feet high and 14 feet in diameter; it has a mark engraved on the rock *in situ*, a mark-stone fixed in its upper surface, and two others inserted in it intermediately. The distances and bearings of the surrounding villages are:—Bara,  $1\frac{1}{4}$  miles S.S.W.; Keotili,  $2\frac{1}{4}$  miles E.; Kasda W.N.W.,  $1\frac{1}{2}$  miles; and Jhondawal, about  $5\frac{1}{2}$  miles N.N.E.

III. Jamaura (*Jamaora*) Hill Station, lat.  $24^{\circ} 54'$ , long.  $82^{\circ} 30'$ —observed at in 1846—is situated on high ground distant about  $1\frac{1}{2}$  miles E.N.E. of the village of Jamaura: thana Lalganj, tappa Upraudh, tahsil and district Mirzapur.

The station consists of a platform (of rubble stone and earth) 8 feet high and about 14 feet in diameter: it has a mark-stone at top, and two others at 2.2 and 3.6 feet respectively below it. The distances and bearings of surrounding villages are:—Ghura Khand,  $2\frac{1}{2}$  miles W.; and Burshon, 2 miles E.

IV. Katra Hill Station, lat.  $24^{\circ} 51'$ , long.  $82^{\circ} 12'$ —observed at in 1846—is situated on the heights 3 miles S. of the village of Katra sometimes also called Drummondganj; thana Lalganj, tappa Upraudh, tahsil and district Mirzapur.

The station consists of a circular tower of rubble stone and earth 16 feet in diameter, enclosing a central isolated pillar 6 feet high (of the same materials) having a mark-stone at top, and others at 3.8 and 5.3 feet respectively above the lowest mark which is engraved on the rock *in situ*. The distances and bearings of surrounding villages are:—Bhesaund,  $1\frac{1}{2}$  miles E.N.E.; Lohriadar,  $2\frac{1}{4}$  miles W. by N.; and Karampur,  $2\frac{1}{4}$  miles S. by E.

V. Tikor Hill Station, lat.  $25^{\circ} 4'$ , long.  $82^{\circ} 22'$ —observed at in 1846—is situated on one of the low heights  $\frac{1}{4}$  of a mile S.W. by W. of the village of Tikor: thana Bindhachal, tappa Chhiánue, tahsil and district Mirzapur.

The station consists of a circular tower (of rubble stone and earth)—with diameters at top and bottom, respectively, of 18 and 22 feet—enclosing a central solid pillar of masonry having a mark-stone at its base, and others at 6, 12 and 16 feet respectively above it. The distances and bearings of surrounding villages are:—Dhuri, 1 mile W. by S.; Neorihia, 1 mile S. by E.; and Mara or Manda,  $3\frac{1}{2}$  miles N.W. by W.

VI. Meja (*Mega*) Hill Station, lat.  $25^{\circ} 7'$ , long.  $82^{\circ} 9'$ —observed at in 1846—is situated on a low height about  $1\frac{1}{2}$  miles S. of the town of Meja, in the lands of the village of Basaira from which it is distant 2 miles N.: thana and tahsil Meja, pargana Khairagarh, district Allahabad.

The station consists of a platform (of rubble stone and earth) 8.2 feet high and 18 feet in diameter: it has a mark-stone at top, and others at 1.6 and 3 feet respectively below it. The distances and bearings of surrounding villages are:—Gunaigharpur,  $2\frac{1}{4}$  miles N.N.E.; and Sikhi,  $2\frac{1}{2}$  miles S.W.



VII. Baripur (*Baripur*) Tower Station, lat.  $25^{\circ} 17'$ , long.  $82^{\circ} 20'$ —observed at in 1846—is situated at 250 yards from the N. bank of the Ganges, and about  $\frac{1}{2}$  a mile E. of the village of Baripur Khás: thána Sháhganj, tahsíl Korh, pargana Bhadohi, district Mirzapur.

The station consists of an earthen tower enclosing a central solid pillar of masonry 30 feet high which has a mark-stone at top, another at bottom, and others at 10, 19 and 27 feet respectively above the latter. The distances and bearings of surrounding villages are:—Baripur Nárípur, on the N. bank of the Ganges,  $1\frac{1}{4}$  miles W. by S.; Phútwaría,  $\frac{3}{4}$  mile E.; and Bankat Khás,  $1\frac{1}{4}$  miles N.E.

VIII. Ganeshpur (*Ganespur*) Tower Station, lat.  $25^{\circ} 20'$ , long.  $82^{\circ} 8'$ —observed at in 1846—is situated on a spot elevated about 10 feet above the level of the surrounding country, close to and S.E. of the village of Ganeshpur: thána Handia, pargana Kiwái, district Allahabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry 30 feet high which has a mark-stone at top, another at bottom, and others at 10, 19 and 27 feet respectively above the latter. The distances and bearings of surrounding places are:—The old fort of Amlauti,  $3\frac{3}{4}$  miles E. by S.; Misrain,  $1\frac{1}{4}$  miles N.N.E.; and Dumduma, 1 mile S.S.W.

IX. Seona Tower Station, lat.  $25^{\circ} 28'$ , long.  $82^{\circ} 19'$ —observed at in 1846—is situated on a spot elevated about 12 feet above the level of the surrounding country, and distant 200 yards W. of village of Seona: thána and tahsíl Handia, pargana Mah, district Allahabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry 23 feet high which has a mark-stone at top, another at bottom, and others at 8, 15 and 21 feet respectively above the latter. The distances and bearings of surrounding places are:—The town of Kiwái,  $4\frac{1}{2}$  miles S.E.; Ghulwa,  $\frac{1}{2}$  mile W. by S.; Kundi, 1 mile E.; and Misrúr,  $\frac{1}{2}$  mile S.

X. Birua (*Birua*) Tower Station, lat.  $25^{\circ} 31'$ , long.  $82^{\circ} 7'$ —observed at in 1846 and 1847—is situated on a mound of saltpetre works elevated about 10 feet above the plain, and is nearly  $\frac{1}{2}$  a mile N. W. of Birua or Pír Kází village: thána Phúlpur, pargana Sikandra, district Allahabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry 30 feet high which has a mark-stone at top, another at bottom, and others at 10, 19 and 27 feet respectively above the latter. The distances and bearings of surrounding places are:—Mustafabad village,  $1\frac{1}{2}$  miles W.; Míapúra village,  $1\frac{1}{4}$  miles E. by N.; and Phúlpur town, about  $2\frac{1}{4}$  miles N.E. by N.

XI. Marár Tower Station, lat.  $25^{\circ} 41'$ , long.  $82^{\circ} 17'$ —observed at in 1846 and 1847—is situated on a mound elevated about 60 feet above the level of the surrounding plain, and is distant about 350 yards N.E. of the village of Marár Díh: thána Mungra Bádsháhpur, tahsíl Machlishahr, pargana Mungra, district Jaunpur.

The station consists of an earthen tower enclosing a central solid pillar of masonry 19 feet high which has a mark-stone at top, another at bottom, and others at 7, 13 and 18 feet respectively above the latter. The distances and bearings of surrounding places are:—Rámnagar village,  $2\frac{1}{4}$  miles W.N.W.; Naráinpur village,  $1\frac{1}{2}$  miles N.E.; Umrganj village, 1 mile E. by S.; and the town of Bádsháhpur, 3 miles S.W.

XII. Rámápúra (*Rámápúra*) Tower Station, lat.  $25^{\circ} 45'$ , long.  $82^{\circ} 8'$ —observed at in 1847—is situated on an ancient village site elevated about 13 feet above the level of the surrounding country, and about  $\frac{1}{2}$  a mile N. of the village of Rámápúra: thána Rániganj, tahsíl Patti, district Partabgarh.

The station consists of an earthen tower enclosing a central solid pillar of masonry 30 feet high which has a mark-stone at top, another at bottom, and others at 14, 19 and 22 feet respectively above the latter. The distances and bearings of surrounding villages are:—Kaulapur,  $\frac{1}{2}$  mile N. by E.; Bhawánigarh,  $1\frac{1}{4}$  miles S. by W.; and Gaura,  $1\frac{1}{2}$  miles E. by S.

XIII. Newáda Tower Station, lat.  $25^{\circ} 50'$ , long.  $82^{\circ} 18'$ —observed at in 1847—is situated at about  $\frac{1}{2}$  mile S. W. of the village of Newáda, and stands at a distance of about 1 mile S. of the old fort of Dáúdpur: thána and tahsíl Patti, district Partabgarh.

The station consists of an earthen tower enclosing a central pillar of masonry 24 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The distances and bearings of surrounding places are:—Kotani village,  $\frac{1}{2}$  mile E.S.E.; Bábuganj village,  $\frac{3}{4}$  mile S.E.; and the town of Bhadeora, about  $4\frac{1}{2}$  miles N.W. by W.

XIV. *Parípura (Parípúra)* Tower Station, lat.  $25^{\circ} 55'$ , long.  $82^{\circ} 9'$ —observed at in 1847—is situated on the bank of a tank in the lands of the village of *Parípura*; it stands at a distance of about 2 miles N.N.E. of the great bend in the *Sai* river, and  $\frac{1}{4}$  mile S. of the high road from *Patti* to *Partabgarh*: *thána* and *tahsíl Patti*, district *Partabgarh*.

The station consists of an earthen tower enclosing a central solid pillar of masonry 20 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The distances and bearings of surrounding places are :—*Jaisingarh* fort, 1 mile S.E.; *Khojikalán* village, 1 mile S.W. by W.; and *Púra Pande* village, about  $\frac{3}{4}$  mile N.N.W.

XV. *Saifabad (Saifábád)* Tower Station, lat.  $26^{\circ} 1'$ , long.  $82^{\circ} 19'$ —observed at in 1847—is situated on the N. E. angle of an old fort in the lands of the village of *Saifabad*, and is elevated about 27 feet above the level of the surrounding country: *thána* and *tahsíl Patti*, district *Partabgarh*.

The station consists of an earthen tower enclosing a central solid pillar 12 feet high which has a mark-stone at top, another at bottom, and a third at 4 feet above the latter. The distances and bearings of surrounding villages are :—*Dhansar*,  $\frac{3}{4}$  mile E.S.E.; *Jehanabad*, nearly 1 mile N.W.; and *Naurangabad*,  $\frac{1}{2}$  mile N. by W.

XVI. *Newa* Tower Station, lat.  $26^{\circ} 6'$ , long.  $82^{\circ} 10'$ —observed at in 1847—is situated in the vicinity of the village of *Newa*, and stands on a site elevated about 10 feet above the level of the surrounding country which is much intersected by tanks and swamps: *thána Lamhwa*, *tahsíl Kádipur*, *pargana Chánda*, district *Sultanpur*.

The station consists of an earthen tower enclosing a central solid pillar of masonry 26 feet high which has a mark-stone at top, another at bottom, and others at 8, 16 and 24 feet respectively above the latter. The distances and bearings of surrounding villages are :—*Sheogarh*, 1 mile E.N.E.; *Sansáripur*, about  $\frac{1}{2}$  mile N.W.; and *Kaithapur*, nearly  $1\frac{1}{2}$  miles S. by E.

XVII. *Dopáp* Tower Station, lat.  $26^{\circ} 11'$ , long.  $82^{\circ} 19'$ —observed at in 1847—is situated in the village of *Dopáp*, and stands in the centre of an old ruined fort, the eastern face of which is washed by the *Gumti* river: *thána Lamhwa*, *pargana Chánda*, district *Sultanpur*.

The station consists of an earthen platform enclosing a central solid pillar of masonry 24 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The distances and bearings of surrounding villages are :—*Lotia*,  $\frac{1}{4}$  mile S. by E.; *Mungapur*, nearly 1 mile W.; and *Sukhauli*, about a mile N.N.W.

XVIII. *Sirwára* Tower Station, lat.  $26^{\circ} 16'$ , long.  $82^{\circ} 10'$ —observed at in 1847—is situated at rather less than half a mile S.E. of the village of *Sirwára*, and stands on the W. side of a small tank distant about  $\frac{1}{2}$  mile from the left bank of the *Gumti* river: *thána* and *tahsíl Sultanpur*, *pargana Baraunsa*, district *Sultanpur*.

The station consists of an earthen tower enclosing a central solid pillar of masonry 28 feet high which has a mark-stone at top, another at bottom, and others at 8, 16, 20 and 24 feet respectively above the latter. The distances and bearings of surrounding places are :—The minarets of *Sultanpur*,  $2\frac{1}{2}$  miles W.N.W.; *Bhikhapur* temple,  $\frac{1}{4}$  mile S.W.; *Fatehpur* village, nearly 1 mile E.; and *Itkauli* village, about 1 mile N. by E.

XIX. *Kapradi (Kaprádi)* Tower Station, lat.  $26^{\circ} 22'$ , long.  $82^{\circ} 19'$ —observed at in 1847—is situated at  $\frac{1}{4}$  mile S. E. of the village of *Kapradi*, and stands on the site of an ancient village which is elevated about 16 feet above the level of the surrounding country: *thána Kurai-bhár*, *tahsíl Sultanpur*, *pargana Baraunsa*, district *Sultanpur*.

The station consists of an earthen tower enclosing a central solid pillar of masonry  $25\frac{1}{2}$  feet high which has a mark-stone at top, another at bottom, and others at 8, 12, 15 and 20 feet above the latter. The distances and bearings of surrounding villages are :—*Gurbár*, nearly  $\frac{1}{2}$  mile N.; *Mahmúdpur*,  $\frac{3}{4}$  mile E.S.E.; *Dubepurwa*,  $\frac{3}{4}$  mile S.; and *Rámnáthpur*,  $\frac{1}{2}$  mile N.N.W.

XX. *Rarauli (Raraoli)* Tower Station, lat.  $26^{\circ} 27'$ , long.  $82^{\circ} 11'$ —observed at in 1847—is situated at about 300 yards W.S.W. of the village of *Rarauli*, and stands on the N. bank of a tank: *tahsíl Bikapur*, *pargana Pachhimráth*, district *Fyzabad*.

The station consists of an earthen tower enclosing a central solid pillar of masonry 32 feet high which has a mark-stone at top, another at bottom, and others at 8, 16 and 24 feet respectively above the latter. The distances and bearings of surrounding villages are :—*Saidkhánpur*,  $1\frac{1}{4}$  miles W.S.W.; *Jagdispur*, 1 mile N.E.; *Athgaon*, 1 mile E. by S.; and *Umrbar*, 1 mile S. by W.

XXI. Nansa Tower Station, lat.  $26^{\circ} 32'$ , long.  $82^{\circ} 20'$ —observed at in 1847—is situated within the village of Nansa, and stands at the S. W. angle of the fort. The Madha river flows at a distance of  $3\frac{1}{2}$  miles N., and the Bisúhi at 3 miles S. of the station: tahsíl Bikapur, pargana Pachhimráth, district Fyzabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry (height not forthcoming) which has a mark-stone at top, and others—it is assumed—built into the tower as in the adjacent stations. The distances and bearings of surrounding villages are:—Bakhtipur, over  $\frac{1}{4}$  mile W. by N.; Bhaisauli, 1 mile N.E.; Dhaurahra,  $1\frac{1}{4}$  miles S.E.; and Jadopur,  $1\frac{1}{2}$  miles S.S.W.

XXII. Ráhet Tower Station, lat.  $26^{\circ} 37'$ , long.  $82^{\circ} 11'$ —observed at in 1847—is situated about 250 yards S. by W. of the village of Ráhet, and stands on a site that is elevated about 16 feet above the level of the surrounding country. One of the main channels of the Madha river is nearly  $\frac{3}{4}$  of a mile N. of the station: thána and tahsíl Bikapur, pargana Pachhimráth, district Fyzabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry 25 $\frac{1}{2}$  feet high which has a mark-stone at top, another at bottom, and others at 8, 12 and 16 feet respectively above the latter. The distances and bearings of surrounding places are:—Ruknuddínpur village,  $\frac{3}{4}$  mile S.S.E.; Dashratpur village,  $\frac{1}{2}$  mile N.E.; and the town of Bhadarsa, 2 miles N.W.

XXIII. Bisaul (*Bisaol*) Tower Station, lat.  $26^{\circ} 41'$ , long.  $82^{\circ} 23'$ —observed at in 1847—is situated just within the boundary of the village of Bisaul, and is distant about half a mile from the right bank of the Gogra river: thána Mahárájanj, tahsíl Fyzabad, pargana Amsin, district Fyzabad.

The station consists of an earthen tower enclosing a central solid pillar of masonry 24 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The distances and bearings of surrounding villages are:—Isa Saráe, nearly  $\frac{3}{4}$  mile N.N.W.; Raipur, nearly 1 mile E.S.E.; and Jurhi, about  $1\frac{1}{2}$  miles S.W.

XXIV. Orejhár (*Ordjar*) Station, lat.  $26^{\circ} 47'$ , long.  $82^{\circ} 15'$ —observed at in 1847—is situated in the southern suburbs of the city of Ajodhya, and stands on a conical hill (about 80 feet in height) named Orejhár from the circumstance—as is said—of its having been formed by the deposit of rubbish removed from the city. Towards the N.W. of the station is some high ground raised about 60 feet above the level of the surrounding country: this is said to be the site of the ancient city; it is now occupied as a burial ground, and has a secondary station fixed on it. The station is in thána and tahsíl Fyzabad, pargana Ajodhya, district Fyzabad.

The station consists of an earthen platform enclosing a central solid pillar of masonry, which is carried up to a height of 8 feet above ground level, and has a mark-stone at top, and others at 4, 8 and 10 feet respectively below this surface. The distances and bearings of surrounding places are:—The city of Ajodhya,  $1\frac{1}{2}$  miles N.; the town of Fyzabad, nearly 3 miles W. by S.; and the village of Barchta, about  $\frac{1}{2}$  mile N.E.

XXV. Kumeria (*Kumeria*) Tower Station, lat.  $26^{\circ} 52'$ , long.  $82^{\circ} 35'$ —observed at in 1847—is situated at the S.W. angle of the village of Kumeria, and stands on a spot elevated 30 feet above the level of the surrounding country. The Manwar river winds round at the distance of a mile to the S.W. of the station: thána Parsrámpur, pargana Amorha, district Basti.

The station consists of an earthen tower enclosing a central solid pillar of masonry 27 feet high which has a mark-stone at top, another at bottom, and others at 8, 16 and 24 feet respectively above the latter. The distances and bearings of surrounding villages are:—Jagdísipur,  $1\frac{1}{4}$  miles W.N.W.; Nipania, nearly  $\frac{3}{4}$  mile S. by W.; Basewa,  $\frac{3}{4}$  mile E.S.E.; and Kurmia,  $\frac{1}{2}$  mile N.N.E.

XXVI. Tikeria (*Tikeria*) Tower Station, lat.  $26^{\circ} 57'$ , long.  $82^{\circ} 16'$ —observed at in 1847—is situated in the lands of the Debinagar Grant, and stands on high ground about 250 yards from the right bank of the Chamnai river: thána Wazírganj, pargana Nawabganj, district Gonda.

The station consists of an earthen tower enclosing a central solid pillar of masonry 26 feet high which has a mark-stone at top, another at bottom, and others at 8, 16 and 20 feet respectively above the latter. The distances and bearings of surrounding villages are:—Jánkinagar,  $1\frac{1}{2}$  miles N.E.; Saráe,  $1\frac{1}{2}$  miles S.S.W.; Jalmalpur,  $1\frac{1}{4}$  miles W.S.W.; and Rámgarh,  $1\frac{1}{4}$  miles N.N.W.

XXVII. Sabanjot (*Sabánjot*) Tower Station, lat.  $27^{\circ} 3'$ , long.  $82^{\circ} 26'$ —observed at in 1847—is situated in the village of that name which lies in the low marshy ground skirting the N. bank of the Bisúhi river: thána and tahsíl Utraula, pargana Sadullahnagar, district Gonda.

The station consists of an earthen tower enclosing a central solid pillar of masonry 32 feet high which has a mark-stone at top, another at bottom, and others at 9, 18 and 26 feet respectively above the latter. The distances and bearings of surrounding villages are:—Chandaugot,  $\frac{1}{2}$  mile N. by W.; Kakarghatta, about a mile W.S.W.; and Singarghat, nearly  $\frac{3}{4}$  mile S.E.

XXVIII. Kopa Tower Station, lat.  $27^{\circ} 7'$ , long.  $82^{\circ} 15'$ —observed at in 1847—is situated at  $\frac{1}{4}$  of a mile S.S.E. of Kopa village, and stands on a site elevated about 11 feet above the level of the surrounding country: it is about  $2\frac{1}{2}$  miles S.W. of the Bisúhi and nearly the same distance N. of the Manwar river: thána Intwa, pargana Manikapur, district Gonda.

The station consists of an earthen tower enclosing a central solid pillar of masonry 20 feet high which has a mark-stone at top, another at bottom, and others at 7 and 14 feet respectively above the latter. The distances and bearings of surrounding villages are:—Dhuswa Khás, 1 mile S.; Karnapur,  $\frac{3}{4}$  mile N.N.E.; and Jigna,  $1\frac{1}{4}$  miles W.

XXIX. Mánapára (*Mánápára*) Tower Station, lat.  $27^{\circ} 13'$ , long.  $82^{\circ} 22'$ —observed at in 1847—is situated in the lands of Jafrabad village, and stands on an elevation (12 feet high) in low, densely wooded, marshy ground at a distance of 220 yards N. of the Kuwána river: thána, tahsíl and pargana Utraula, district Gonda.

The station consists of an earthen tower enclosing a central solid pillar of masonry 30 feet high which has a mark-stone at top, another at bottom, and others at 9, 18 and 26 feet respectively above the latter. The distances and bearings of surrounding villages are:—Mahmúdnagar, nearly  $1\frac{1}{2}$  miles N.; Bhur,  $1\frac{1}{2}$  miles W.S.W.; and Mudui Khán,  $1\frac{1}{2}$  miles E.S.E.

XXX. Gurúnagar (*Gurunagar*) Tower Station, lat.  $27^{\circ} 18'$ , long.  $82^{\circ} 11'$ —observed at in 1847—is situated about  $\frac{1}{2}$  mile N.N.E., of Gurúnagar village, and stands on a slight elevation very close to the S. bank of the Pirári, an affluent of the Kuwána river: thána Aiah, tahsíl, pargana and district Gonda.

The station consists of an earthen tower enclosing a central solid pillar of masonry 24 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The distances and bearings of surrounding villages are:—Madhnagar, about  $\frac{3}{4}$  mile S.W.; Bardand,  $1\frac{1}{4}$  miles W. by N.; Naktapur, 1 mile S.S.E.; and Sumda,  $1\frac{1}{2}$  miles E. by S.

XLIII.—(*Of the North-East Longitudinal Series*). Saibara Tower Station, lat.  $27^{\circ} 27'$ , long.  $82^{\circ} 8'$ —observed at in 1847 and 1849—is situated about 300 yards N.W. of the village of Saibara, and at the N.W. angle of a square tank: thána and pargana Balrámpur, district Gonda.

The station as built in 1847 consists of an earthen tower enclosing a central solid pillar of masonry 24 feet high which has a mark-stone at top, another at bottom, and others at 8 and 16 feet respectively above the latter. The station was revisited in 1849 in the course of the North-East Longitudinal Series operations but no alteration in its construction appears to have been then made. The distances and bearings of surrounding villages are:—Duária,  $\frac{1}{2}$  mile N.N.W.; Gidhuraia, about  $1\frac{1}{2}$  miles N.E.; Sharúpur,  $1\frac{1}{2}$  miles S.E. by E.; and Buráepur,  $\frac{3}{4}$  mile W.

XLV.—(*Of the North-East Longitudinal Series*). Bansídila Tower Station, lat.  $27^{\circ} 24'$ , long.  $82^{\circ} 19'$ —observed at in 1847 and 1849—is situated about 200 yards S.W. of the village of Bansídila, and stands on the site of an ancient village elevated about 18 feet above the level of the country. The land to the north of the station is much intersected by streams and tanks, and the river Rapti flows about  $1\frac{1}{4}$  miles to the N.: thána and pargana Balrámpur, district Gonda.

The station as built in 1847 consists of an earthen tower enclosing a central solid pillar of masonry 20 feet high which has a mark-stone at top, another at bottom, and others at 7 and 13 or 14 feet respectively above the latter. The station was revisited in 1849 in the course of the North-East Longitudinal Series operations but no alteration in its construction appears to have been then made. The distances and bearings of surrounding villages are:—Firozpur,  $\frac{1}{4}$  mile S. by W.; Bhagwatpur, 1 mile N.W.; Tendúa, 1 mile N.E.; and Pursea, 1 mile E.S.E.

NOTE.—In a few instances the names of principal stations, occurring in the foregoing descriptions, are given by two methods of spelling, distinguished from one another by the use of Roman and Italic type; as in I. Murchia (*Murchia*): the latter spelling is taken from the Alphabetical and Numerical lists, which precede the descriptions and which were printed in 1869: the spelling in Roman type is in accordance with the method authorized by the Government and illustrated in lists of Indian proper names published in 1874 and subsequently. It will be seen that the two methods differ but slightly; notwithstanding, where differences exist, both renderings are given, so as to remove all possible doubt as to the identity of a station. The method of spelling authorized by the Government, is hereafter exclusively adopted in the publication of this Series.

February 1879.

J. B. N. HENNESSEY,  
In charge of Computing Office.

## GURWANI MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the preceding descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

| No. of Station | Local name | District                 | Pargana, &c.                                    | Village in which the Station lies | Remarks on the Condition of the Station             |
|----------------|------------|--------------------------|-------------------------------------------------|-----------------------------------|-----------------------------------------------------|
| XXIX           | Chapri     | Baghelkhand, Rewah State | Táluka Singrauli                                | Chapri                            | ... ..                                              |
| XXXI           | Pokra      | "                        | Táluka Bardi                                    | Pokra                             | ... ..                                              |
| I              | Murchia    | "                        | P. Rewah                                        | Jerauha                           | ... ..                                              |
| II             | ...        | "                        | Tah. Bardi                                      | Kista                             | ... ..                                              |
| III            | Jamaura    | Mirzapur                 | Thá. Lálganj, Tappa Upraudh, Tah. Mirzapur      | Jamaura                           | ... ..                                              |
| IV             | Katra      | "                        | Ditto.                                          | Mahágarhi                         | ... ..                                              |
| V              | Tikor      | "                        | Thá. Bindháchal, Tappa Chhiánue, Tah. Mirzapur  | Tikor                             | Tower fallen down on all sides as reported in 1872. |
| VI             | ...        | Allahabad                | Thá. and Tah. Meja, P. Khairagarh, Táluka Daiya | Basaira                           | Upper mark-stone missing as reported in 1867.       |
| VII            | Barípur    | Mirzapur                 | Thá. Sujanganj, P. Bha-dohi, Tah. Korh          | Kurwa Barípur                     | Half of the pillar fallen down as reported in 1867. |
| VIII           | ...        | Allahabad                | Thá. and Tah. Handia, P. Kiwái, Táluka Mawaiya  | Ganeshipur                        | Upper mark-stone missing as reported in 1867.       |
| IX             | ...        | "                        | Thá. and Tah. Handia, P. Mah, Táluka Masudhi    | Seona                             | Ditto.                                              |

NOTE.—Stations XXIX and XXXI appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral. and Thá. for thána.

P. stands for pargana, Tah. for tahsil,

| No.<br>of Station | Local name           | District   | Pargana, &c.                                                         | Village in which<br>the Station<br>lies | Remarks on the<br>Condition of the Station         |
|-------------------|----------------------|------------|----------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------|
| X                 | ...                  | Allahabad  | Thá. and Tah. Phulpur,<br>P. Sikandra                                | Pír Kázi <i>alias</i><br>Birua          | Upper mark-stone missing as report-<br>ed in 1867. |
| XI                | Marárdi              | Jaunpur    | Thá. Mungra Bádsháh-<br>pur, P. Mungra                               | Marárdih                                | ... ..                                             |
| XII               | Rámapur              | Partabgarh | Thá. Rániganj, P. and<br>Tah. Patti, Táluka Rae-<br>pur Bichu        | Rámpur                                  | ... ..                                             |
| XIII              | Newáda               | "          | Thá., Tah. and P. Patti,<br>Táluka Saifabad                          | Newáda                                  | Very dilapidated as reported in 1878.              |
| XIV               | Púra Pande           | "          | Ditto.                                                               | Púra Pande                              | ... ..                                             |
| XV                | Saifabad             | "          | Ditto.                                                               | Saifabad                                | ... ..                                             |
| XVI               | Durbín Minár         | Sultanpur  | Thá. Lamhwa, Tah. Ká-<br>dipur, P. Chánda, Tálu-<br>ka Sheogarh      | Newa                                    | ... ..                                             |
| XVII              | "                    | "          | Thá. Lamhwa, Tah. Ká-<br>dipur, P. Chánda, Tálu-<br>ka Sháhpur       | Sháhpur                                 | ... ..                                             |
| XVIII             | "                    | "          | Thá. and Tah. Sultanpur,<br>P. Baraunsa                              | Sirwára                                 | ... ..                                             |
| XIX               | "                    | "          | Thá. Kuraibhár, Tah. Sul-<br>tanpur, P. Baraunsa,<br>Táluka Dhannodi | Kapradi                                 | ... ..                                             |
| XX                | Rarauli              | Fyzabad    | Tah. Bikapur, Táluka<br>Kurwar, P. Pachhim-<br>ráth                  | Rarauli                                 | ... ..                                             |
| XXI               | Nansa                | "          | Tah. Bikapur, Táluka Sihi-<br>pur, P. Pachhimráth                    | Nansa                                   | Upper mark-stone missing as report-<br>ed in 1878. |
| XXII              | Ráhet                | "          | Thá. and Tah. Bikapur,<br>P. Pachhimráth                             | Ráhet                                   | ... ..                                             |
| XXIII             | Dalpatpur            | "          | Thá. Mahárájganj, P.<br>Amsin, Tah. Fyzabad,<br>Táluka Sihipur       | Bisaul                                  | ... ..                                             |
| XXIV              | Kázipur              | "          | Thá. and Tah. Fyzabad,<br>P. Haveli                                  | Orehár                                  | ... ..                                             |
| XXV               | ...                  | Basti      | Thá. Parsrámpur, Tah.<br>Harraiya, P. Amorha.                        | Khamharia                               | Upper mark-stone missing as report-<br>ed in 1867. |
| XXVI              | Jungle Tikri         | Gonda      | Thá. Wazírganj, Tah. Be-<br>gamganj, P. Nawabganj                    | Debinagar Grant                         | Much dilapidated as reported in<br>1875.           |
| XXVII             | Marung Saban-<br>jot | "          | P. and Táluka Sadullah-<br>nagar, Thá. and Tah.<br>Utraula           | Sabanjot                                | ... ..                                             |

NOTE.—P. stands for pargana, Tah. for tahsil, and Thá. for thána.

PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

11\*—*N.*

| No.<br>of Station | Local name           | District | Pargana, &c.                                              | Village in which<br>the Station<br>lies | Remarks on the<br>Condition of the Station             |
|-------------------|----------------------|----------|-----------------------------------------------------------|-----------------------------------------|--------------------------------------------------------|
| XXVIII            | Marung Kopa          | Gonda    | P. and Táluka Manika-<br>pur, Thá. Etwah, Tah.<br>Utraula | Kopa                                    | ...                                                    |
| XXIX              | Marung Jáfra-<br>bad | "        | P., Táluka, Thá. and Tah.<br>Utraula                      | Jáfrabad                                | ...                                                    |
| XXX               | Madhnagar            | "        | Táluka Singha Chanda,<br>Thá. Aiah, P. and Tah.<br>Gonda  | Madhnagar                               | Pillar partially fallen down as report-<br>ed in 1875. |
| XLIII             | Sabaira              | "        | P. and Thá. Balrámpur,<br>Tah. Utraula                    | Sabaira                                 | ...                                                    |
| XLV               | Básadela             | "        | P., Thá. and Táluka Bal-<br>rámpur, Tah. Utraula          | Básadela                                | ...                                                    |

NOTE.—Stations XLIII and XLV appertain to the North-East Longitudinal Series.

P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

*September, 1882.*

J. B. N. HENNESSEY,  
*In charge of Computing Office.*





## GURWANI MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. TRIANGLES.

| No. of Triangle | Station      | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|--------------|------------------|-----------------------|-----------|----------|--------|
|                 |              |                  |                       | Log. feet | Feet     | Miles  |
| 1               | Chapri, XXIX | .64              | 67 28 56.52           | 5.0248745 | 105894.8 | 20.056 |
|                 | Pokra, XXXI  | .63              | 66 27 40.54           | 5.0215846 | 105095.6 | 19.904 |
|                 | Murchia, I   | .63              | 46 3 22.94            | 4.9166608 | 82539.3  | 15.632 |
| 2               | Pokra, XXXI  | .64              | 48 31 53.31           | 4.9350090 | 86101.2  | 16.307 |
|                 | Murchia, I   | .65              | 64 18 37.82           | 5.0151422 | 103548.1 | 19.611 |
|                 | Kasda, II    | .65              | 67 9 28.87            | 5.0248745 | 105894.8 | 20.056 |
| 3               | Murchia, I   | .79              | 75 44 52.23           | 5.1101598 | 128872.4 | 24.408 |
|                 | Kasda, II    | .78              | 63 53 42.46           | 5.0770082 | 119401.1 | 22.614 |
|                 | Jamaura, III | .78              | 40 21 25.31           | 4.9350090 | 86101.2  | 16.307 |
| 4               | Murchia, I   | .82              | 49 3 9.73             | 4.9891122 | 97524.1  | 18.470 |
|                 | Jamaura, III | .82              | 63 19 1.52            | 5.0620825 | 115367.2 | 21.850 |
|                 | Katra, IV    | .82              | 67 37 48.75           | 5.0770082 | 119401.1 | 22.614 |
| 5               | Jamaura, III | .52              | 66 12 54.64           | 4.9814924 | 95828.0  | 18.149 |
|                 | Katra, IV    | .52              | 45 9 8.11             | 4.8706758 | 74246.5  | 14.062 |
|                 | Tikor, V     | .53              | 68 37 57.25           | 4.9891122 | 97524.1  | 18.470 |

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Stations Chapri, XXIX, and Pokra, XXXI appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

| No. of Triangle | Station         | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|-----------------|------------------|-----------------------|-----------|----------|--------|
|                 |                 |                  |                       | Log. feet | Feet     | Miles  |
| 6               | Katra, IV       | "                | ° ' "                 |           |          |        |
|                 | Tikor, V        | .52              | 43 18 33'84           | 4'8598534 | 72419'2  | 13'716 |
|                 | Meja, VI        | .52              | 71 30 23'28           | 5'0005416 | 100124'8 | 18'963 |
| 7               | Tikor, V        | .52              | 65 11 2'88            | 4'9814924 | 95828'0  | 18'149 |
|                 | Meja, VI        | .41              | 65 38 52'17           | 4'9104025 | 81358'4  | 15'409 |
|                 | Baripur, VII    | .40              | 60 9 55'49            | 4'8891229 | 77468'1  | 14'672 |
| 8               | Meja, VI        | .40              | 54 11 12'34           | 4'8598534 | 72419'2  | 13'716 |
|                 | Baripur, VII    | .38              | 49 28 32'63           | 4'8253800 | 66892'9  | 12'669 |
|                 | Ganeshpur, VIII | .38              | 62 55 47'79           | 4'8941016 | 78361'3  | 14'841 |
| 9               | Baripur, VII    | .39              | 67 35 39'58           | 4'9104025 | 81358'4  | 15'409 |
|                 | Ganeshpur, VIII | .33              | 64 40 41'88           | 4'8556215 | 71716'9  | 13'583 |
|                 | Seona, IX       | .32              | 57 51 2'70            | 4'8272027 | 67174'2  | 12'722 |
| 10              | Ganeshpur, VIII | .32              | 57 28 15'42           | 4'8253800 | 66892'9  | 12'669 |
|                 | Seona, IX       | .33              | 58 16 47'61           | 4'8353606 | 68448'0  | 12'964 |
|                 | Birua, X        | .33              | 58 41 21'45           | 4'8372634 | 68748'5  | 13'021 |
| 11              | Seona, IX       | .34              | 63 1 50'94            | 4'8556215 | 71716'9  | 13'583 |
|                 | Birua, X        | .41              | 63 52 20'65           | 4'9112611 | 81519'4  | 15'439 |
|                 | Marár, XI       | .41              | 67 12 8'46            | 4'9227479 | 83704'3  | 15'853 |
| 12              | Birua, X        | .40              | 48 55 30'89           | 4'8353606 | 68448'0  | 12'964 |
|                 | Marár, XI       | .32              | 37 7 27'37            | 4'7181857 | 52262'0  | 9'898  |
|                 | Rámapura, XII   | .33              | 72 35 0'55            | 4'9170940 | 82621'7  | 15'648 |
| 13              | Marár, XI       | .32              | 70 17 32'08           | 4'9112611 | 81519'4  | 15'439 |
|                 | Rámapura, XII   | .22              | 70 30 12'93           | 4'7915805 | 61884'3  | 11'721 |
|                 | Newáda, XIII    | .21              | 56 44 17'60           | 4'7395207 | 54893'5  | 10'396 |
| 14              | Rámapura, XII   | .21              | 52 45 29'47           | 4'7181857 | 52262'0  | 9'898  |
|                 | Newáda, XIII    | .22              | 53 0 45'80            | 4'7313107 | 53865'5  | 10'202 |
|                 | Paripura, XIV   | .23              | 60 23 53'12           | 4'7681482 | 58633'8  | 11'105 |
| 15              | Newáda, XIII    | .23              | 66 35 21'08           | 4'7915805 | 61884'3  | 11'721 |
|                 | Paripura, XIV   | .26              | 67 25 10'85           | 4'8263499 | 67042'5  | 12'697 |
|                 | Saifabad, XV    | .26              | 64 41 24'00           | 4'8171594 | 65638'6  | 12'432 |
| 16              | Paripura, XIV   | .25              | 47 53 25'15           | 4'7313107 | 53865'5  | 10'202 |
|                 | Saifabad, XV    | .27              | 51 8 2'66             | 4'7619164 | 57798'5  | 10'947 |
|                 | Newa, XVI       | .27              | 64 17 29'19           | 4'8253235 | 66884'2  | 12'667 |
| 17              | Saifabad, XV    | .28              | 64 34 28'15           | 4'8263499 | 67042'5  | 12'697 |
|                 | Newa, XVI       | .24              | 62 54 39'51           | 4'7825129 | 60605'6  | 11'478 |
|                 | Dopáp, XVII     | .24              | 58 58 44'96           | 4'7659472 | 58337'4  | 11'049 |
| 18              | Newa, XVI       | .23              | 58 6 35'53            | 4'7619164 | 57798'5  | 10'947 |
|                 | Dopáp, XVII     | .26              | 57 44 40'65           | 4'7856091 | 61039'2  | 11'560 |
|                 | Sirwára, XVIII  | .27              | 65 9 0'24             | 4'8162085 | 65495'1  | 12'404 |
| 19              | Dopáp, XVII     | .26              | 57 6 19'11            | 4'7825129 | 60605'6  | 11'478 |
|                 | Sirwára, XVIII  | .25              | 53 5 11'22            | 4'7596977 | 57503'9  | 10'891 |
|                 | Kapradi, XIX    | .26              | 68 50 35'63           | 4'8265497 | 67073'3  | 12'703 |
| 20              | Sirwára, XVIII  | .26              | 58 4 13'15            | 4'7856091 | 61039'2  | 11'560 |
|                 | Kapradi, XIX    | .22              | 51 39 4'62            | 4'7254274 | 53140'7  | 10'065 |
|                 | Rarauli, XX     | .23              | 70 17 4'11            | 4'8047379 | 63787'8  | 12'081 |
|                 |                 | .23              | 58 3 51'27            | 4'7596977 | 57503'9  | 10'891 |

# PRINCIPAL TRIANGULATION. TRIANGLES.

11—N.

| No. of Triangle | Station         | Spherical Excess | Corrected Plane Angle |    | Distance  |           |         |        |
|-----------------|-----------------|------------------|-----------------------|----|-----------|-----------|---------|--------|
|                 |                 |                  |                       |    | Log. feet | Feet      | Miles   |        |
| 21              | Kapradi, XIX    | "                | 0                     | 1  | "         |           |         |        |
|                 | Rarauli, XX     | .22              | 60                    | 33 | 2.01      | 4.7624172 | 57865.2 | 10.959 |
|                 | Nansa, XXI      | .22              | 66                    | 20 | 54.96     | 4.7844008 | 60869.6 | 11.528 |
| 22              | Rarauli, XX     | .24              | 58                    | 33 | 4.88      | 4.7662726 | 58381.2 | 11.057 |
|                 | Nansa, XXI      | .24              | 63                    | 42 | 56.81     | 4.7878714 | 61358.0 | 11.621 |
|                 | Ráhet, XXII     | .23              | 57                    | 43 | 58.31     | 4.7624172 | 57865.2 | 10.959 |
| 23              | Nansa, XXI      | .26              | 76                    | 17 | 29.37     | 4.8527330 | 71241.5 | 13.493 |
|                 | Ráhet, XXII     | .25              | 50                    | 56 | 44.09     | 4.7554522 | 56944.6 | 10.785 |
|                 | Bisaul, XXIII   | .25              | 52                    | 45 | 46.54     | 4.7662726 | 58381.2 | 11.057 |
| 24              | Ráhet, XXII     | .28              | 53                    | 42 | 17.96     | 4.7863774 | 61147.3 | 11.581 |
|                 | Bisaul, XXIII   | .28              | 56                    | 24 | 20.21     | 4.8006854 | 63195.4 | 11.969 |
|                 | Orejvár, XXIV   | .29              | 69                    | 53 | 21.83     | 4.8527330 | 71241.5 | 13.493 |
| 25              | Bisaul, XXIII   | .28              | 58                    | 28 | 47.52     | 4.8003346 | 63144.4 | 11.959 |
|                 | Orejvár, XXIV   | .28              | 65                    | 52 | 52.72     | 4.8299909 | 67606.9 | 12.804 |
|                 | Kumeria, XXV    | .27              | 55                    | 38 | 19.76     | 4.7863774 | 61147.3 | 11.581 |
| 26              | Orejvár, XXIV   | .25              | 53                    | 35 | 55.30     | 4.7603679 | 57592.8 | 10.908 |
|                 | Kumeria, XXV    | .26              | 64                    | 27 | 36.04     | 4.8099801 | 64562.5 | 12.228 |
|                 | Tikeria, XXVI   | .26              | 61                    | 56 | 28.66     | 4.8003346 | 63144.4 | 11.959 |
| 27              | Kumeria, XXV    | .26              | 56                    | 10 | 23.13     | 4.7769339 | 59832.1 | 11.332 |
|                 | Tikeria, XXVI   | .26              | 70                    | 43 | 54.87     | 4.8324426 | 67989.6 | 12.877 |
|                 | Sabanjot, XXVII | .25              | 53                    | 5  | 42.00     | 4.7603679 | 57592.8 | 10.908 |
| 28              | Tikeria, XXVI   | .25              | 62                    | 53 | 18.42     | 4.7909867 | 61799.7 | 11.704 |
|                 | Sabanjot, XXVII | .24              | 57                    | 35 | 40.38     | 4.7680225 | 58616.9 | 11.102 |
|                 | Kopa, XXVIII    | .24              | 59                    | 31 | 1.20      | 4.7769339 | 59832.1 | 11.332 |
| 29              | Sabanjot, XXVII | .24              | 49                    | 30 | 48.59     | 4.7286258 | 53533.5 | 10.139 |
|                 | Kopa, XXVIII    | .25              | 69                    | 5  | 4.76      | 4.8178904 | 65749.2 | 12.452 |
|                 | Mánapára, XXIX  | .24              | 61                    | 24 | 6.65      | 4.7909867 | 61799.7 | 11.704 |
| 30              | Kopa, XXVIII    | .26              | 63                    | 57 | 24.33     | 4.8146677 | 65263.1 | 12.360 |
|                 | Mánapára, XXIX  | .26              | 68                    | 34 | 5.10      | 4.8300483 | 67615.8 | 12.806 |
|                 | Gurúnagar, XXX  | .25              | 47                    | 28 | 30.57     | 4.7286258 | 53533.5 | 10.139 |
| 31              | Mánapára, XXIX  | .27              | 52                    | 38 | 53.92     | 4.7684804 | 58678.7 | 11.113 |
|                 | Gurúnagar, XXX  | .28              | 65                    | 12 | 27.06     | 4.8261592 | 67013.0 | 12.692 |
|                 | Bansídila, XLV  | .27              | 62                    | 8  | 39.02     | 4.8146677 | 65263.1 | 12.360 |
| 32              | Gurúnagar, XXX  | .25              | 65                    | 10 | 36.38     | 4.8031378 | 63553.3 | 12.037 |
|                 | Bansídila, XLV  | .25              | 57                    | 53 | 39.82     | 4.7731591 | 59314.3 | 11.234 |
|                 | Saibara, XLIII  | .24              | 56                    | 55 | 43.80     | 4.7684804 | 58678.7 | 11.113 |

NOTE.—Stations Saibara, XLIII, and Bansídila, XLV appertain to the North-East Longitudinal Series.

August 1879.

J. B. N. HENNESSEY,  
In charge of Computing Office.

## GURWANI MERIDIONAL SERIES.

## SECONDARY TRIANGULATION. TRIANGLES.

## PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

| No. of Triangle | Station                                           | Corrected Plane Angle        | Distance                          |                           |                            | No. of Triangle | Station                                      | Corrected Plane Angle                   | Distance                         |                            |                            | No. of Triangle | Station | Corrected Plane Angle | Distance  |      |       | Theodolite used | Inch |
|-----------------|---------------------------------------------------|------------------------------|-----------------------------------|---------------------------|----------------------------|-----------------|----------------------------------------------|-----------------------------------------|----------------------------------|----------------------------|----------------------------|-----------------|---------|-----------------------|-----------|------|-------|-----------------|------|
|                 |                                                   |                              | Log. feet                         | Feet                      | Miles                      |                 |                                              |                                         | Log. feet                        | Feet                       | Miles                      |                 |         |                       | Log. feet | Feet | Miles |                 |      |
| 33              | Chapri, XXIX<br>Pokra, XXXI<br>Tendua             | h.s.<br>87 42 38             | 4 769117<br>4 997346<br>4 910661  | 58765<br>99391<br>82539   | 11 130<br>18 824<br>15 632 | 38              | Pokra, XXXI<br>Bargawa<br>Panjerio Hill Mark | h.s.<br>42 52 33<br>78 6 17             | 4 826815<br>4 984615<br>4 927197 | 67114<br>96320<br>84566    | 12 711<br>18 280<br>16 016 | 18              |         |                       |           |      |       |                 |      |
| 34              | Pokra, XXXI<br>Tendua<br>Bargawa*                 | h.s.<br>152 23 44            | 4 446957<br>4 927197<br>4 769117  | 27987<br>84566<br>58765   | 5 301<br>16 016<br>11 130  | 39              | Bargawa<br>Dibar<br>Bhawaniapur†             | h.s.<br>67 18 57<br>46 34 43            | 5 213372<br>5 209423<br>5 109465 | 163445<br>161966<br>128666 | 30 956<br>30 675<br>24 369 | "               |         |                       |           |      |       |                 |      |
| 35              | Chapri, XXIX<br>Pokra, XXXI<br>Adhesar Hill Mark† | 75 47 53<br>64 47 24         | 5 100481<br>5 070491<br>4 910661  | 126032<br>117623<br>82539 | 23 870<br>22 277<br>15 632 | 40              | Bargawa<br>Dibar<br>Deopura                  | h.s.<br>41 46 0<br>89 22 43<br>48 51 17 | 5 056183<br>5 232619<br>5 109465 | 113811<br>170852<br>128666 | 21 555<br>32 358<br>24 369 | "               |         |                       |           |      |       |                 |      |
| 36              | Pokra, XXXI<br>Bargawa<br>Dibar                   | h.s.<br>112 16 6<br>25 57 50 | 4 5109465<br>5 252255<br>4 927197 | 128666<br>178754<br>84566 | 24 369<br>33 855<br>16 016 | 41              | Bargawa<br>Bhawaniapur<br>Deopura            | h.s.<br>25 32 57<br>70 30 34            | 4 869816<br>5 232619<br>5 209423 | 74100<br>170852<br>161966  | 14 034<br>32 358<br>30 675 | "               |         |                       |           |      |       |                 |      |
| 37              | Bargawa<br>Dibar<br>Panjerio Hill Mark            | h.s.<br>27 15 50             | 4 915260<br>4 826815<br>5 109465  | 82273<br>67114<br>128666  | 15 582<br>12 711<br>24 369 | 42              | Bargawa<br>Dibar<br>Rajapur                  | h.s.<br>48 2 4<br>80 15 4<br>51 42 52   | 5 085941<br>5 208315<br>5 109465 | 121882<br>161553<br>128666 | 23 084<br>30 597<br>24 369 | "               |         |                       |           |      |       |                 |      |

\* There are two more triangles to this station, see Nos. 83 and 84. Difference between the common side of triangles Nos. 34 and 84 is 6 feet.  
† to this point, see Nos. 103 and 104.

Notes.—1. Names followed by Roman numerals are those of Principal Stations. Stations Chapri, XXIX, and Pokra, XXXI appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.  
2. The values of the side are given in the same line with the opposite angle.



| No. of Triangle | Station                                           | Corrected Plane Angle | Distance                                     |                            |                               | No. of Triangle | Station                                         | Corrected Plane Angle            | Distance                                     |                           |                               | Theodolite used |
|-----------------|---------------------------------------------------|-----------------------|----------------------------------------------|----------------------------|-------------------------------|-----------------|-------------------------------------------------|----------------------------------|----------------------------------------------|---------------------------|-------------------------------|-----------------|
|                 |                                                   |                       | Log. feet                                    | Feet                       | Miles                         |                 |                                                 |                                  | Log. feet                                    | Feet                      | Miles                         |                 |
| 69              | Murchia, I<br>Kasda, II<br>Sanderipahar Hill Mark | 68 43 20<br>44 25 28  | 4° 04' 07.94<br>4° 8' 16.535<br>4° 9' 35.009 | 87256<br>65544<br>86101    | 16° 526<br>12° 414<br>16° 307 | 82              | Tatpahar<br>Bautrani<br>Kapar                   | 57 24 35<br>93 59 5              | 4° 49' 60.03<br>4° 25' 05.44<br>4° 50' 35.59 | 31333<br>17805<br>37099   | 5° 934<br>3° 372<br>7° 026    | Inch<br>12<br>" |
| 70              | Chapri, XXIX<br>Murchia, I<br>Tatpahar Hill Mark  | 67 17 16<br>30 54 37  | 4° 09' 09.91<br>4° 73' 67.51<br>5° 02' 15.85 | 97947<br>54545<br>105096   | 18° 551<br>10° 330<br>19° 904 | 83              | Murchia, I<br>Kasda, II<br>Bargawa              | 11 58 38<br>18 13 31             | 4° 55' 04.57<br>4° 72' 85.94<br>4° 93' 50.09 | 35519<br>53530<br>86101   | 6° 727<br>10° 138<br>16° 307  | 18<br>"         |
| 71              | Murchia, I<br>Kasda, II<br>Deori Sohia Mark       | 58 21 35<br>46 48 27  | 4° 88' 05.19<br>4° 8' 13.169<br>4° 93' 50.09 | 75948<br>65038<br>86101    | 14° 384<br>12° 318<br>16° 307 | 84              | Pokra, XXXI<br>Murchia, I<br>Bargawa            | 30 4 13<br>52 20 0               | 4° 72' 85.94<br>4° 92' 19.7<br>5° 02' 48.75  | 53530<br>84566<br>105895  | 10° 138<br>16° 016<br>20° 056 | "<br>"          |
| 72              | Pokra, XXXI<br>Kasda, II<br>Deori Sohia Mark      | 39 14 19<br>20 21 3   | 4° 88' 05.19<br>4° 62' 07.12<br>5° 01' 51.42 | 75948<br>4755<br>103548    | 14° 384<br>7° 908<br>19° 611  | 85              | Murchia, I<br>Bargawa<br>Bardi                  | 43 22 59<br>121 52 58            | 4° 63' 64.96<br>4° 20' 50.5<br>4° 72' 85.94  | 43301<br>16033<br>53530   | 8° 201<br>3° 037<br>10° 138   | "<br>7          |
| 73              | Chapri, XXIX<br>Murchia, I<br>Basai Gopat         | 14 7 37<br>148 27 25  | 4° 77' 08.7<br>4° 69' 04.84<br>5° 02' 15.85  | 60129<br>49032<br>105096   | 11° 388<br>9° 286<br>19° 904  | 86              | Murchia, I<br>Sanderipahar Hill Mark<br>Sihawal | 98 34 35<br>52 51 46             | 4° 91' 00.88<br>4° 59' 44.83<br>4° 81' 65.35 | 81300<br>39308<br>65544   | 15° 398<br>7° 445<br>12° 414  | 18<br>7         |
| 74              | Kasda, II<br>Murchia, I<br>Amdara Peak            | 65 19 7<br>33 8 12    | 4° 89' 81.49<br>4° 67' 74.55<br>4° 93' 50.09 | 79095<br>47583<br>86101    | 14° 980<br>9° 012<br>16° 307  | 87              | Murchia, I<br>Gurdari Hill Mark<br>Sihawal      | 70 49 0<br>76 40 5               | 4° 83' 92.74<br>4° 59' 44.83<br>4° 85' 22.20 | 69068<br>39308<br>71157   | 13° 081<br>7° 445<br>13° 477  | 18<br>7         |
| 75              | Pokra, XXXI<br>Murchia, I<br>Amdara Peak          | 46 58 8<br>31 10 26   | 4° 89' 81.49<br>4° 74' 82.67<br>5° 02' 48.75 | 79095<br>56010<br>105895   | 14° 980<br>10° 608<br>20° 056 | 88              | Tatpahar<br>Khamerji<br>Baragaon                | 62 19 26<br>56 12 57<br>61 27 37 | 4° 84' 08.19<br>4° 81' 32.61<br>4° 83' 73.22 | 69314<br>65052<br>68758   | 13° 128<br>12° 320<br>13° 022 | 12<br>"         |
| 76              | Kasda, II<br>Murchia, I<br>Cheropahar Peak        | 55 34 16<br>37 7 11   | 4° 85' 18.52<br>4° 71' 01.53<br>4° 93' 50.09 | 71097<br>32018<br>86101    | 13° 465<br>9° 852<br>16° 307  | 89              | Chapri, XXIX<br>Tatpahar<br>Baragaon            | 112 11 5<br>32 25 19             | 4° 81' 32.61<br>5° 01' 70.40<br>4° 77' 97.29 | 65052<br>104002<br>60218  | 12° 320<br>19° 097<br>11° 405 | "<br>"          |
| 77              | Pokra, XXXI<br>Murchia, I<br>Cheropahar Peak      | 37 17 42<br>27 11 27  | 4° 85' 18.52<br>4° 79' 33.12<br>5° 02' 48.75 | 71097<br>53618<br>105895   | 13° 465<br>10° 155<br>20° 056 | 90              | Murchia, I<br>Chapri, XXIX<br>Baragaon          | 67 35 24<br>69 6 1               | 5° 01' 70.40<br>4° 88' 74.39<br>5° 02' 15.85 | 104002<br>77167<br>105096 | 19° 097<br>14° 615<br>19° 904 | 18<br>12        |
| 78              | Chapri, XXIX<br>Murchia, I<br>Pakera              | 31 21 32<br>115 36 4  | 4° 83' 03.8<br>4° 78' 27.98<br>5° 02' 15.85  | 63539<br>60645<br>105096   | 12° 034<br>11° 486<br>19° 904 | 91              | Tatpahar<br>Khamerji<br>Pahari                  | 40 28 26<br>103 39 29            | 4° 61' 76.19<br>4° 66' 20.92<br>4° 83' 73.22 | 41459<br>45930<br>68758   | 7° 852<br>8° 699<br>13° 022   | "<br>"          |
| 79              | Murchia, I<br>Gurdari Hill Mark<br>Pakera         | 45 14 39<br>75 6 28   | 4° 71' 83.86<br>4° 83' 03.8<br>4° 85' 22.20  | 52286<br>63539<br>71157    | 9° 003<br>12° 034<br>13° 477  | 92              | Tatpahar<br>Baragaon<br>Pahari                  | 40 31 49<br>113 0 50             | 4° 49' 81.34<br>4° 66' 20.92<br>4° 81' 32.61 | 31487<br>45930<br>65052   | 5° 963<br>8° 699<br>12° 320   | "<br>"          |
| 80              | Murchia, I<br>Katra, IV<br>Khamerji               | 65 17 27<br>67 23 26  | 5° 15' 40.12<br>5° 10' 09.86<br>5° 06' 20.83 | 142565<br>144873<br>115367 | 27° 001<br>27° 438<br>21° 850 | 93              | Khamerji<br>Pahari<br>Pahara                    | 115 59 9<br>45 53 51             | 4° 71' 51.49<br>4° 25' 41.31<br>4° 61' 76.19 | 51898<br>17953<br>41459   | 9° 829<br>3° 400<br>7° 852    | "<br>"          |
| 81              | Tatpahar<br>Khamerji<br>Bautrani                  | 76 6 15<br>31 2 13    | 4° 84' 41.54<br>4° 59' 35.9<br>4° 83' 73.22  | 69848<br>57099<br>68758    | 13° 229<br>7° 026<br>13° 022  | 94              | Tatpahar<br>Khamerji<br>Pahara                  | 75 30 43<br>89 21 13             | 4° 25' 41.31<br>4° 82' 33.15<br>4° 83' 73.22 | 17953<br>66576<br>68758   | 3° 400<br>12° 009<br>13° 022  | "<br>"          |

NOTE.—Stations Chapri, XXIX and Pokra, XXXI appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral. \* Base deduced by two sides and included angle.

## SECONDARY TRIANGULATION. TRIANGLES.

15—N.

| No. of Triangle | Station                                         | Corrected Plane Angle                 | Distance                         |                           |                           | No. of Triangle | Station                                          | Corrected Plane Angle              | Distance                         |                          |                            | Theodolite used | Inch |
|-----------------|-------------------------------------------------|---------------------------------------|----------------------------------|---------------------------|---------------------------|-----------------|--------------------------------------------------|------------------------------------|----------------------------------|--------------------------|----------------------------|-----------------|------|
|                 |                                                 |                                       | Log. feet                        | Feet                      | Miles                     |                 |                                                  |                                    | Log. feet                        | Feet                     | Miles                      |                 |      |
| 95              | Tatapahar<br>Baragaon<br>Karbara                | h.s.<br>" s.<br>136 25 35             | 4.507202<br>4.578263<br>4.813261 | 32152<br>37867<br>65052   | 6.089<br>7.172<br>12.320  | 108             | Khámerji<br>Kesra Hill Mark<br>Mau Rock          | 85 21 53<br>37 48 3<br>37 48 3     | 4.789353<br>4.713549<br>4.578178 | 61568<br>51707<br>37860  | 11.661<br>9.793<br>7.170   | "               | 12   |
| 96              | Baragaon<br>Pahári<br>Karbara                   | h.s.<br>" s.<br>85 35 18<br>77 32 13  | 3.971308<br>4.507202<br>4.498134 | 9361<br>32152<br>31487    | 1.773<br>6.089<br>5.963   | 109             | Khámerji<br>Machir<br>Mau Rock                   | 117 13 54<br>41 58 18<br>41 58 18  | 4.314860<br>4.713549<br>4.589840 | 20647<br>51707<br>38890  | 3.910<br>9.793<br>7.306    | "               | "    |
| 97              | Pahári<br>Karbara<br>Murda Hill Temple          | h.s.<br>" s.<br>30 8 6<br>123 41 8    | 4.027426<br>4.240861<br>3.971308 | 10652<br>17655<br>9361    | 2.017<br>3.344<br>1.773   | 110             | Jamaura, III<br>Katra, IV<br>Chaunia Hill Mark   | 39 30 33<br>62 52 19<br>62 52 19   | 4.802927<br>4.948717<br>4.989112 | 63522<br>88862<br>97524  | 12.031<br>16.830<br>18.470 | 18              | "    |
| 98              | Khámerji<br>Baragaon<br>Nagrai Rock             | h.s.<br>" s.<br>27 59 1<br>106 37 53  | 4.711762<br>4.530753<br>4.840819 | 51495<br>33943<br>69314   | 9.753<br>6.429<br>13.128  | 111             | Murchia, I<br>Jamaura, III<br>Chaunia Hill Mark  | 43 16 25<br>23 48 29<br>23 48 29   | 4.948717<br>4.718751<br>5.077008 | 88862<br>52330<br>119401 | 16.830<br>9.911<br>22.614  | "               | "    |
| 99              | Khámerji<br>Bilauhi<br>Kesra Hill Mark          | h.s.<br>" s.<br>139 40 9<br>9 27 10   | 5.173752<br>4.578178<br>5.073011 | 149194<br>37860<br>118307 | 28.256<br>7.170<br>22.407 | 112             | Murchia, I<br>Katra, IV<br>Murli                 | 13 31 29<br>27 20 10<br>27 20 10   | 4.615321<br>4.908367<br>5.062083 | 41240<br>80978<br>115367 | 7.811<br>15.337<br>21.850  | "               | "    |
| 100             | Khámerji<br>Nagrai Rock<br>Kesra Hill Mark      | h.s.<br>s.<br>127 47 12<br>27 38 16   | 4.809563<br>4.578178<br>4.530753 | 64500<br>37860<br>33943   | 12.216<br>7.170<br>6.429  | 113             | Katra, IV<br>Chaunia Hill Mark<br>Murli          | 22 34 39<br>125 31 40<br>125 31 40 | 4.476646<br>4.615321<br>4.802927 | 29967<br>41240<br>63522  | 5.676<br>7.811<br>12.031   | "               | 12   |
| 101             | Baragaon<br>Khámerji<br>Taripater Rock          | h.s.<br>" s.<br>17 27 56<br>115 9 21  | 4.750882<br>4.361408<br>4.840819 | 56348<br>22983<br>69314   | 10.672<br>4.353<br>13.128 | 114             | Jamaura, III<br>Katra, IV<br>Kálápatrí Hill Mark | 28 41 59<br>60 29 0<br>60 29 0     | 4.670596<br>4.928782<br>4.989112 | 46838<br>84875<br>97524  | 8.871<br>16.075<br>18.470  | 18              | "    |
| 102             | Tatapahar<br>Baragaon<br>Taripater Rock         | h.s.<br>" s.<br>108 50 20<br>54 27 17 | 4.361408<br>4.878908<br>4.813261 | 22983<br>75667<br>65052   | 4.353<br>14.331<br>12.320 | 115             | Katra, IV<br>Murli<br>Kálápatrí Hill Mark        | 20 11 20<br>99 33 4<br>99 33 4     | 4.214624<br>4.670596<br>4.615321 | 16392<br>46838<br>41240  | 3.104<br>8.871<br>7.811    | 18              | 12   |
| 103             | Murchia, I<br>Jamaura, III<br>Adhesar Hill Mark | h.s.<br>" s.<br>50 18 34<br>8 24 11   | 5.031471<br>4.310016<br>5.077008 | 107515<br>20418<br>119401 | 20.363<br>3.867<br>22.614 | 116             | Khámerji<br>Baragaon<br>Sabkalai                 | 38 41 47<br>38 41 47<br>38 41 47   | 4.928851<br>5.044686<br>4.840819 | 84889<br>110837<br>69314 | 16.077<br>20.992<br>13.128 | "               | "    |
| 104             | Murchia, I<br>Kasda, II<br>Adhesar Hill Mark    | 126 3 27<br>9 32 58                   | 4.997814<br>4.310016<br>4.935009 | 99498<br>20418<br>86101   | 18.844<br>3.867<br>10.307 | 117             | Khámerji<br>Baragaon<br>Bilauhi                  | 114 11 34<br>32 18 17<br>32 18 17  | 4.854852<br>5.073011<br>4.840819 | 71590<br>118307<br>69314 | 13.559<br>22.407<br>13.128 | "               | "    |
| 105             | Murchia, I<br>Adhesar Hill Mark<br>Parsia       | 59 41 59<br>77 4 28                   | 4.257371<br>4.156774<br>4.310016 | 18087<br>14347<br>20418   | 3.426<br>2.717<br>3.867   | 118             | Baragaon<br>Sabkalai<br>Bilauhi                  | 55 46 7<br>101 22 29<br>101 22 29  | 4.526776<br>4.854852<br>4.928851 | 33634<br>71590<br>84889  | 6.370<br>13.559<br>16.077  | "               | "    |
| 106             | Khámerji<br>Nagrai Rock<br>Machir               | h.s.<br>s.<br>98 45 51<br>59 36 38    | 4.161419<br>4.589840<br>4.530753 | 14502<br>38890<br>33943   | 2.747<br>7.366<br>6.429   | 119             | Murchia, I<br>Katra, IV<br>Bilauhi               | 45 20 17<br>123 34 34<br>123 34 34 | 4.425291<br>4.993391<br>5.062083 | 26625<br>98490<br>115367 | 5.043<br>18.053<br>21.850  | 18              | 12   |
| 107             | Nagrai Rock<br>Machir<br>Mau Temple             | s.<br>h.s.<br>10 17 41<br>163 32 10   | 4.382307<br>4.582571<br>4.161419 | 24116<br>38245<br>14502   | 4.567<br>7.243<br>2.747   | 120             | Baragaon<br>Bilauhi<br>Baraiha (?) Tree Flag     | 24 54 42<br>67 52 33<br>67 52 33   | 4.479876<br>4.822151<br>4.854852 | 30191<br>66397<br>71590  | 5.718<br>12.575<br>13.559  | "               | "    |

| No. of Triangle | Station                                           | Corrected Plane Angle         | Distance                         |                         |                         | No. of Triangle | Station                                            | Corrected Plane Angle            | Distance                         |                           |                            | Theodolite used |
|-----------------|---------------------------------------------------|-------------------------------|----------------------------------|-------------------------|-------------------------|-----------------|----------------------------------------------------|----------------------------------|----------------------------------|---------------------------|----------------------------|-----------------|
|                 |                                                   |                               | Log. feet                        | Feet                    | Miles                   |                 |                                                    |                                  | Log. feet                        | Feet                      | Miles                      |                 |
| 121             | Katra, IV<br>Bilauhi<br>Baraiha (?) Tree Flag     | h.s.<br>33 24 52<br>117 31 50 | 4.479876<br>4.686777<br>4.425291 | 30191<br>48616<br>26625 | 5.718<br>9.208<br>5.043 | 134             | Tikor, V<br>Meja, VI<br>Sansarpur Hill Mark        | 57 32 57<br>79 24 28             | 4.951987<br>5.018256<br>4.859853 | 89534<br>104293<br>72419  | 16.957<br>19.753<br>13.716 | Inch<br>18<br>" |
| 122             | Bilauhi<br>Baraiha (?) Tree Flag<br>Jigni         | h.s.<br>67 59 19<br>42 11 13  | 4.619928<br>4.625296<br>4.479876 | 41680<br>42198<br>30191 | 7.894<br>7.992<br>5.718 | 135             | Katra, IV<br>Murli<br>Mugarikot                    | 96 50 9<br>17 10 13<br>65 59 38  | 4.631513<br>4.124746<br>4.615321 | 44824<br>13327<br>41240   | 8.489<br>2.524<br>7.811    | 18<br>12<br>"   |
| 123             | Katra, IV<br>Bilauhi<br>Naun Hill Mark            | h.s.<br>25 27 12<br>83 24 25  | 4.082500<br>4.446376<br>4.425291 | 12092<br>27950<br>26625 | 2.290<br>5.293<br>5.043 | 136             | Katra, IV<br>Meja, VI<br>Chalinga Hill Mark        | 134 50 0<br>6 23 40              | 5.054555<br>4.250589<br>5.000542 | 113385<br>17807<br>100125 | 21.474<br>3.373<br>18.903  | 18<br>"         |
| 124             | Bilauhi<br>Jigni<br>Birohi Rock                   | h.s.<br>7 57 47<br>6 45 41    | 4.361729<br>4.291075<br>4.625296 | 23000<br>19547<br>42198 | 4.356<br>3.702<br>7.992 | 137             | Katra, IV<br>Mugarikot<br>Chalinga Hill Mark       | 102 54 46<br>45 4 57             | 4.389355<br>4.250589<br>4.124746 | 24511<br>17807<br>13327   | 4.642<br>3.373<br>2.524    | 18<br>12        |
| 125             | Bilauhi<br>Naun Hill Mark<br>Birohi Rock          | h.s.<br>83 6 39<br>33 33 34   | 4.336783<br>4.291075<br>4.082500 | 21716<br>19547<br>12092 | 4.113<br>3.702<br>2.290 | 138             | Katra, IV<br>Meja, VI<br>Majgaon Hill Mark         | 64 39 52<br>36 41 15             | 4.965203<br>4.785424<br>5.000542 | 92300<br>61013<br>100125  | 17.481<br>11.556<br>18.903 | 18<br>"         |
| 126             | Jigni<br>Birohi Rock<br>Kodali Hill Mark          | h.s.<br>49 10 31<br>62 57 0   | 4.273879<br>4.344635<br>4.361729 | 18788<br>22112<br>23000 | 3.558<br>4.188<br>4.356 | 139             | Tikor, V<br>Meja, VI<br>Majgaon Hill Mark          | 44 39 33<br>101 52 18            | 4.965203<br>5.108927<br>4.859853 | 92300<br>128507<br>72419  | 17.481<br>24.338<br>13.716 | "<br>"          |
| 127             | Bilauhi<br>Jigni<br>Kodali Hill Mark              | h.s.<br>29 57 40<br>42 24 50  | 4.344635<br>4.475146<br>4.625296 | 22112<br>29864<br>42198 | 4.188<br>5.656<br>7.992 | 140             | Katra, IV<br>Mugarikot<br>Daia                     | 63 10 42<br>94 33 36<br>22 15 42 | 4.496861<br>4.544917<br>4.124746 | 31395<br>35068<br>13327   | 5.946<br>6.642<br>2.524    | "<br>12<br>"    |
| 128             | Bilauhi<br>Birohi Rock<br>Naun Temple             | h.s.<br>13 19 30<br>21 8 52   | 3.900870<br>4.091484<br>4.291075 | 7959<br>12459<br>19547  | 1.507<br>2.360<br>3.702 | 141             | Katra, IV<br>Majgaon Hill Mark<br>Daia             | 33 24 24<br>115 16 46            | 4.569961<br>4.544917<br>4.785424 | 37150<br>35068<br>61013   | 7.036<br>6.642<br>11.556   | 18<br>12        |
| 129             | Bilauhi<br>Baraiha (?) Tree Flag<br>Hanumana Rock | h.s.<br>23 51 36<br>135 28 2  | 4.240884<br>4.181774<br>4.479876 | 17413<br>15198<br>30191 | 3.298<br>2.878<br>5.718 | 142             | Katra, IV<br>Mugarikot<br>Katra Pass               | 68 38 34<br>29 50 53<br>81 30 33 | 4.098635<br>3.826502<br>4.124746 | 12550<br>6707<br>13327    | 2.377<br>1.270<br>2.524    | 18<br>12<br>7   |
| 130             | Katra, IV<br>Bilauhi<br>Hanumana Rock             | h.s.<br>93 40 14<br>57 32 19  | 4.181774<br>4.498184<br>4.425291 | 15198<br>31491<br>26625 | 2.878<br>5.964<br>5.043 | 143             | Mugarikot<br>Daia<br>Katra Pass                    | 64 42 43<br>23 33 1<br>139 49 14 | 4.453311<br>4.098635<br>4.496861 | 28400<br>12550<br>31395   | 5.379<br>2.377<br>5.946    | 12<br>"         |
| 131             | Bilauhi<br>Hanumana Rock<br>Baisaur Rock          | h.s.<br>67 28 24<br>48 31 34  | 4.260805<br>4.272674<br>4.181774 | 18231<br>18736<br>15198 | 3.453<br>3.548<br>2.878 | 144             | Mugarikot<br>Katra Pass<br>Katra Patrol's Bungalow | 28 17 43<br>23 33 1<br>139 49 14 | 3.964745<br>3.602680<br>4.098635 | 9220<br>4006<br>12550     | 1.746<br>0.759<br>2.377    | 7<br>"          |
| 132             | Bilauhi<br>Sabbalai<br>Baisaur Rock               | h.s.<br>91 48 18              | 4.436928<br>4.272674<br>4.326776 | 27348<br>18736<br>33634 | 5.180<br>3.548<br>6.370 | 145             | Mugarikot<br>Katra Pass<br>Katra Dāk Bungalow      | 125 22 36<br>46 19 30            | 4.150687<br>3.398685<br>4.098635 | 14148<br>2504<br>12550    | 2.679<br>0.474<br>2.377    | 12<br>7         |
| 133             | Katra, IV<br>Murli<br>Garbara Temple              | h.s.<br>16 32 39<br>20 35 37  | 4.288946<br>4.380694<br>4.615321 | 19451<br>24027<br>41240 | 3.684<br>4.551<br>7.811 | 146             | Katra, IV<br>Chaunia Hill Mark<br>Baraunda Bridge  | 101 48 9<br>45 13 0              | 4.942526<br>4.687691<br>4.802927 | 87604<br>48718<br>63522   | 16.592<br>9.227<br>12.031  | 18<br>7         |



## SECONDARY TRIANGULATION. TRIANGLES.

17—X.

| No. of Triangle | Station                                           | Corrected Plane Angle | Distance                                     |                            |                                  | No. of Triangle used | Station                                         | Corrected Plane Angle             | Distance                                     |                         |                                  | Theodolite used  |
|-----------------|---------------------------------------------------|-----------------------|----------------------------------------------|----------------------------|----------------------------------|----------------------|-------------------------------------------------|-----------------------------------|----------------------------------------------|-------------------------|----------------------------------|------------------|
|                 |                                                   |                       | Log. feet                                    | Feet                       | Miles                            |                      |                                                 |                                   | Log. feet                                    | Feet                    | Miles                            |                  |
| 147             | Katra, IV<br>Munli<br>Baraunda                    | 78 8 14<br>43 9 37    | 4° 77' 08.63<br>4° 71' 19.41<br>4° 61' 53.21 | 59001<br>51516<br>41240    | 11° 17.5<br>9° 7.57<br>7° 8.11   | Inch<br>18<br>7      | Meja, VI<br>Kohrar<br>Kohrar Temple             | 6 38 32<br>40 8 44                | 3° 91' 14.65<br>4° 63' 76.26<br>4° 71' 08.69 | 8156<br>45400<br>51389  | 1° 54.5<br>8° 01.0<br>9° 7.33    | Inch<br>18<br>12 |
| 148             | Katra, IV<br>Meja, VI<br>Bakshipahar Hill Mark    | 62 58 50<br>73 20 43  | 5° 11' 11.48<br>5° 14' 27.30<br>5° 00' 54.2  | 129166<br>138009<br>100125 | 24° 46.3<br>26° 30.9<br>18° 9.63 | 18<br>12             | Kohrar<br>Daraul<br>Kohrar Temple               | 5 58 53                           | 4° 41' 25.92<br>3° 91' 14.65<br>4° 53' 39.39 | 25858<br>8156<br>33415  | 4° 8.97<br>1° 54.5<br>6° 32.9    | "                |
| 149             | Katra, IV<br>Bakshipahar Hill Mark<br>Karaun Fort | 41 12 56<br>115 5 28  | 5° 00' 45.93<br>4° 78' 93.22<br>5° 14' 27.30 | 101063<br>61636<br>138909  | 19° 14.1<br>11° 6.73<br>26° 30.9 | 18<br>12             | Meja, VI<br>Kohrar<br>Ramnagar Temple           | 82 46 45                          | 4° 81' 66.41<br>4° 67' 83.26<br>4° 71' 08.69 | 65560<br>47679<br>51389 | 12° 41.7<br>9° 03.0<br>9° 7.33   | 18               |
| 150             | Katra, IV<br>Majgaon Hill Mark<br>Karaun Fort     | 42 53 58<br>67 48 37  | 4° 65' 18.06<br>4° 78' 98.32<br>4° 78' 54.24 | 44855<br>61636<br>61013    | 8° 49.5<br>11° 6.73<br>11° 5.56  | 18<br>12             | Tikar, V<br>Baripur, VII<br>Ganges River No. 45 | 61 59 26<br>46 1 36               | 4° 85' 08.56<br>4° 76' 80.88<br>4° 88' 91.23 | 71921<br>58626<br>77468 | 13° 62.1<br>11° 10.3<br>14° 6.72 | "                |
| 151             | Tikar, V<br>Meja, VI<br>Kusapurwa Mark            | 27 3 4<br>17 43 36    | 4° 66' 98.66<br>4° 49' 56.13<br>4° 85' 98.53 | 46759<br>31305<br>72419    | 8° 8.56<br>5° 9.29<br>13° 7.16   | 18<br>"              | Tikar, V<br>Ganges River No. 45<br>Siwara       | 73 56 21<br>37 41 25              | 4° 78' 25.07<br>4° 58' 61.18<br>4° 76' 80.88 | 60605<br>38558<br>58626 | 11° 4.78<br>7° 30.3<br>11° 10.3  | "                |
| 152             | Katra, IV<br>Meja, VI<br>Kohrar                   | 106 46 28<br>50 3 15  | 4° 71' 08.69<br>5° 09' 70.59<br>5° 00' 54.2  | 51389<br>125043<br>100125  | 9° 7.33<br>23° 6.82<br>18° 9.63  | "<br>12              | Tikar, V<br>Siwara<br>Pandipura                 | 55 55 48<br>44 2 0                | 4° 66' 23.02<br>4° 73' 74.86<br>4° 58' 61.18 | 45952<br>54637<br>38558 | 8° 70.3<br>10° 34.8<br>7° 30.3   | "                |
| 153             | Katra, IV<br>Bakshipahar Hill Mark<br>Kohrar      | 78 21 2<br>13 50 29   | 4° 95' 81.07<br>5° 09' 70.59<br>5° 14' 27.30 | 90805<br>125043<br>138909  | 17° 19.8<br>23° 6.82<br>26° 30.9 | "                    | Tikar, V<br>Ganges River No. 45<br>Pandipura    | 18 0 33<br>68 27 56<br>93 31 31   | 4° 25' 91.07<br>4° 73' 74.86<br>4° 76' 80.88 | 18160<br>54637<br>58626 | 3° 43.9<br>10° 34.8<br>11° 10.3  | "                |
| 154             | Meja, VI<br>Kohrar<br>Chandas                     | 157 43 17<br>56 14 44 | 4° 51' 09.28<br>4° 29' 86.09<br>4° 71' 08.69 | 32429<br>19889<br>51389    | 6° 14.2<br>3° 7.67<br>9° 7.33    | 18<br>7              | Tikar, V<br>Ganges River No. 45<br>Bhawampur    | 55 55 52<br>80 42 37              | 4° 84' 96.29<br>4° 92' 56.72<br>4° 76' 80.88 | 70734<br>84270<br>58626 | 13° 39.7<br>15° 96.0<br>11° 10.3 | "                |
| 155             | Meja, VI<br>Majgaon Hill Mark<br>Chandas          | 112 15 2<br>53 10 7   | 4° 91' 86.33<br>4° 29' 86.09<br>4° 96' 52.03 | 82915<br>19889<br>92300    | 15° 70.4<br>3° 7.67<br>17° 48.1  | 18<br>7              | Tikar, V<br>Pandipura<br>Bhawampur              | 37 55 19<br>102 52 34             | 4° 72' 53.13<br>4° 92' 56.72<br>4° 73' 74.86 | 53127<br>84270<br>54637 | 10° 06.2<br>15° 96.0<br>10° 34.8 | "                |
| 156             | Meja, VI<br>Chandas<br>Meja                       | 15 48 14<br>111 1 39  | 4° 23' 18.47<br>3° 76' 36.58<br>4° 29' 86.09 | 17035<br>5803<br>19889     | 3° 23.0<br>1° 09.9<br>3° 7.67    | 18<br>7              | Siwara<br>Pandipura<br>Lalganj                  | 63 10 16<br>11 32 53<br>105 16 51 | 4° 62' 84.73<br>3° 97' 93.76<br>4° 66' 23.02 | 42508<br>9536<br>45952  | 8° 05.1<br>1° 80.6<br>8° 70.3    | 7                |
| 157             | Meja, VI<br>Meja<br>Meja Tahsilidari              | 18 21 16<br>133 52 10 | 3° 59' 34.21<br>3° 95' 31.43<br>3° 76' 36.58 | 3921<br>8977<br>5803       | 0° 74.3<br>1° 70.0<br>1° 09.9    | 18<br>7              | Lalganj<br>Siwara<br>Tulsipur Pagoda            | 107 14 8<br>33 17 0               | 4° 15' 60.85<br>3° 91' 54.37<br>3° 97' 93.76 | 14325<br>8231<br>9336   | 2° 71.3<br>1° 55.9<br>1° 80.6    | "                |
| 158             | Meja, VI<br>Meja<br>Meja Fort                     | 32 48 1<br>108 30 38  | 3° 70' 14.81<br>3° 94' 46.42<br>3° 76' 36.58 | 5029<br>8803<br>5803       | 0° 95.2<br>1° 66.7<br>1° 09.9    | 18<br>7              | Tikar, V<br>Siwara<br>Matura                    | 49 5 19<br>110 38 26              | 4° 49' 32.93<br>4° 15' 45.81<br>4° 58' 61.18 | 31138<br>14275<br>38558 | 5° 89.7<br>2° 70.4<br>7° 30.3    | 18               |
| 159             | Meja, VI<br>Kohrar<br>Daraul                      | 30 32 18<br>128 36 29 | 4° 52' 39.39<br>4° 36' 94.05<br>4° 71' 08.69 | 33415<br>23410<br>51389    | 6° 32.9<br>4° 43.4<br>9° 7.33    | 12<br>"              | Tikar, V<br>Matura<br>Bhikapurwa                | 53 35 24<br>27 3 31<br>99 21 5    | 4° 06' 60.74<br>3° 81' 83.09<br>4° 15' 45.81 | 11643<br>6581<br>14275  | 2° 20.5<br>1° 24.6<br>2° 70.4    | 18<br>7<br>"     |

| No. of Triangle | Station                                              | Corrected Plane Angle            | Distance                                   |                         |                              | No. of Triangle | Station                                             | Corrected Plane Angle            | Distance                                   |                         |                            | No. of Triangle | Station | Corrected Plane Angle | Distance  |      |       | Theodolite used |
|-----------------|------------------------------------------------------|----------------------------------|--------------------------------------------|-------------------------|------------------------------|-----------------|-----------------------------------------------------|----------------------------------|--------------------------------------------|-------------------------|----------------------------|-----------------|---------|-----------------------|-----------|------|-------|-----------------|
|                 |                                                      |                                  | Log. feet                                  | Feet                    | Miles                        |                 |                                                     |                                  | Log. feet                                  | Feet                    | Miles                      |                 |         |                       | Log. feet | Feet | Miles |                 |
| 173             | Matura<br>Bhikapurwa<br>Lalganj Pagoda               | 91 18 48<br>41 34 22             | 4' 20 10 29<br>4' 02 30 31<br>4' 06 60 74  | 15887<br>10545<br>11643 | 3' 009<br>1' 997<br>2' 205   | 7               | Ganges River No. 45<br>Pandipura<br>Mirzapur Church | 75 57 1<br>79 0 24               | 4' 61 92 70<br>4' 62 44 16<br>4' 25 59 107 | 41617<br>42113<br>18160 | 7' 882<br>7' 976<br>3' 439 | 18              |         |                       |           |      |       |                 |
| 174             | Tikor, V<br>Ganges River No. 45<br>Mara East         | 92 20 33<br>15 32 40<br>72 6 47  | 4' 78 02 41<br>4' 21 77 16<br>4' 76 80 88  | 61552<br>16509<br>58626 | 11' 638<br>3' 127<br>11' 103 | 18              | Jhúsi<br>Moia<br>Ganges River No. 7                 | 52 44 44<br>45 47 24<br>81 27 52 | 4' 04 37 00<br>3' 99 82 03<br>4' 13 79 75  | 11059<br>9959<br>13740  | 2' 094<br>1' 886<br>2' 602 | 12              |         |                       |           |      |       |                 |
| 175             | Tikor, V<br>Kusalpurwa Mark<br>Mara East             | 62 20 50<br>85 54 58             | 4' 44 10 41<br>4' 21 77 16<br>4' 49 50 13  | 27800<br>16509<br>31305 | 5' 265<br>3' 127<br>5' 929   | 18              | Moia<br>Ganges River No. 7<br>Ditto No. 8           | 47 7 5<br>51 23 44<br>81 29 11   | 3' 91 34 72<br>3' 94 14 26<br>4' 04 37 00  | 8194<br>8738<br>11059   | 1' 552<br>1' 655<br>2' 094 | "               |         |                       |           |      |       |                 |
| 176             | Tikor, V<br>Mara East<br>Mara Dome                   | 20 11 17<br>123 23 45            | 3' 98 21 37<br>4' 36 58 17<br>4' 21 77 16  | 9597<br>23218<br>16509  | 1' 818<br>4' 397<br>3' 127   | 18              | Jhúsi<br>Moia<br>Ganges River No. 8                 | 31 36 17<br>92 54 29<br>55 29 14 | 3' 94 14 26<br>4' 22 14 88<br>4' 13 79 75  | 8738<br>16653<br>13740  | 1' 655<br>3' 154<br>2' 602 | "               |         |                       |           |      |       |                 |
| 177             | Katra, IV<br>Tikor, V<br>Mara East<br>Mara Dome      | 13 47 11<br>86 36 53             | 4' 36 58 17<br>4' 98 79 30<br>4' 98 14 92  | 23218<br>97259<br>95828 | 4' 397<br>18' 420<br>18' 149 | 18              | Moia<br>Ganges River No. 8<br>Ditto No. 9           | 55 33 30<br>66 27 28<br>57 59 2  | 3' 92 93 79<br>3' 97 53 40<br>3' 94 14 26  | 8499<br>9448<br>8738    | 1' 610<br>1' 789<br>1' 655 | "               |         |                       |           |      |       |                 |
| 178             | Tikor, V<br>Mara East<br>Tikor Hill Mark             | 81 24 23<br>43 50 52             | 4' 30 08 04<br>4' 14 02 81<br>4' 21 77 16  | 19990<br>14005<br>16509 | 3' 786<br>2' 652<br>3' 127   | 7               | Ganges River No. 8<br>Ditto No. 9<br>Ditto No. 10   | 92 14 52<br>54 35 45<br>33 9 23  | 4' 19 11 16<br>4' 10 26 52<br>3' 92 93 79  | 15528<br>12666<br>8499  | 2' 941<br>2' 399<br>1' 610 | "               |         |                       |           |      |       |                 |
| 179             | Tikor, V<br>Bhikapurwa<br>Tikor Hill Mark            | 80 22 26<br>72 55 55             | 4' 15 59 684<br>4' 14 62 81<br>3' 81 83 09 | 14444<br>14005<br>6581  | 2' 736<br>2' 652<br>1' 246   | 18              | Ganges River No. 8<br>Ditto No. 10<br>Ditto No. 11  | 40 36 6<br>114 9 53<br>25 14 1   | 4' 28 63 71<br>4' 43 30 98<br>4' 10 26 52  | 19336<br>27108<br>12666 | 3' 662<br>5' 134<br>2' 399 | "               |         |                       |           |      |       |                 |
| 180             | Tikor, V<br>Mara East<br>Mara Temple                 | 21 18 35<br>127 32 55            | 4' 06 44 91<br>4' 43 27 9<br>4' 21 77 16   | 11601<br>25309<br>16509 | 2' 197<br>4' 793<br>3' 127   | 18              | Ganges River No. 9<br>Ditto No. 10<br>Ditto No. 11  | 56 46 58<br>81 0 30<br>42 12 32  | 4' 28 63 71<br>4' 35 84 83<br>4' 19 11 16  | 19336<br>22829<br>15528 | 3' 662<br>4' 324<br>2' 941 | "               |         |                       |           |      |       |                 |
| 181             | Katra, IV<br>Tikor, V<br>Mara Temple                 | 15 2 58<br>85 29 35              | 4' 40 32 79<br>4' 98 75 41<br>4' 98 14 92  | 25309<br>97172<br>95828 | 4' 793<br>18' 404<br>18' 149 | 18              | Ganges River No. 10<br>Ditto No. 11<br>Ditto No. 12 | 56 11 50<br>63 53 25<br>59 54 45 | 4' 26 88 02<br>4' 30 24 77<br>4' 28 63 71  | 18570<br>20067<br>19336 | 3' 517<br>3' 801<br>3' 662 | "               |         |                       |           |      |       |                 |
| 182             | Mara East<br>Mara Temple<br>Mara West                | 18 10 19<br>138 47 53            | 3' 73 97 67<br>3' 83 82 07<br>4' 06 44 91  | 5492<br>6890<br>11601   | 1' 040<br>1' 305<br>2' 197   | 7               | Ganges River No. 10<br>Ditto No. 11<br>Ditto No. 13 | 35 43 14<br>84 14 26<br>60 2 20  | 4' 11 49 59<br>4' 34 64 73<br>4' 28 63 71  | 13030<br>22206<br>19336 | 2' 468<br>4' 206<br>3' 662 | "               |         |                       |           |      |       |                 |
| 183             | Mara East<br>Mara West<br>Bharatganj Pagoda          | 25 12 3<br>105 53 42             | 3' 59 02 57<br>3' 94 14 28<br>3' 83 82 07  | 3893<br>8793<br>6890    | 0' 737<br>1' 665<br>1' 305   | "               | Ganges River No. 11<br>Ditto No. 12<br>Ditto No. 13 | 20 21 1<br>35 30 6<br>124 8 53   | 3' 89 22 65<br>4' 11 49 59<br>4' 26 88 02  | 7803<br>13030<br>18570  | 1' 478<br>2' 468<br>3' 517 | "               |         |                       |           |      |       |                 |
| 184             | Mara East<br>Mara West<br>Birpur Hill Pagoda         | 60 52 1<br>85 28 50              | 4' 03 58 34<br>4' 09 32 23<br>3' 83 82 07  | 10860<br>12394<br>6890  | 2' 057<br>2' 347<br>1' 305   | "               | Ganges River No. 12<br>Ditto No. 13<br>Ditto No. 14 | 72 22 42<br>81 53 48<br>25 43 30 | 4' 23 38 51<br>4' 25 03 65<br>3' 89 22 65  | 17134<br>17798<br>7803  | 3' 245<br>3' 371<br>1' 478 | "               |         |                       |           |      |       |                 |
| 185             | Ganges River No. 45<br>Pandipura<br>Kata Hill Pagoda | 96 54 44<br>47 46 36<br>35 18 40 | 4' 49 39 99<br>4' 36 67 10<br>4' 25 91 07  | 31189<br>23265<br>18160 | 5' 907<br>4' 406<br>3' 439   | 18              | Ganges River No. 13<br>Ditto No. 14<br>Ditto No. 15 | 29 34 59<br>123 54 8<br>26 30 53 | 4' 27 75 49<br>4' 50 31 73<br>4' 23 38 51  | 18947<br>31855<br>17134 | 3' 589<br>6' 033<br>3' 245 | "               |         |                       |           |      |       |                 |

## SECONDARY TRIANGULATION. TRIANGLES.

19

| No. of Triangle | Station                                             | Corrected Plane Angle             | Distance                            |                         |                            | Theodolite used | No. of Triangle | Station                                             | Corrected Plane Angle            | Distance                            |                         |                            | Theodolite used |
|-----------------|-----------------------------------------------------|-----------------------------------|-------------------------------------|-------------------------|----------------------------|-----------------|-----------------|-----------------------------------------------------|----------------------------------|-------------------------------------|-------------------------|----------------------------|-----------------|
|                 |                                                     |                                   | Log. feet                           | Feet                    | Miles                      |                 |                 |                                                     |                                  | Log. feet                           | Feet                    | Miles                      |                 |
| 199             | Ganges River No. 12<br>Ditto No. 14<br>Ditto No. 15 | 42 27 52<br>98 10 38<br>39 21 30  | 4' 277549<br>4' 443722<br>4' 250365 | 18947<br>27779<br>17798 | 3' 589<br>5' 261<br>3' 371 | Inch<br>12<br>" | 212             | Ganges River No. 24<br>Ditto No. 25<br>Ditto No. 27 | 32 25 26<br>113 32 5<br>34 2 29  | 4' 008749<br>4' 241723<br>4' 027466 | 10204<br>17447<br>10653 | 1' 932<br>3' 304<br>2' 018 | Inch<br>12<br>" |
| 200             | Ganges River No. 14<br>Ditto No. 15<br>Ditto No. 16 | 40 44 28<br>61 39 41<br>77 35 51  | 4' 102480<br>4' 232365<br>4' 277549 | 12661<br>17075<br>18947 | 2' 398<br>3' 234<br>3' 589 | "               | 213             | Ganges River No. 24<br>Ditto No. 27<br>Ditto No. 28 | 47 24 29<br>94 37 35<br>37 57 56 | 4' 319707<br>4' 451298<br>4' 241723 | 20879<br>28268<br>17447 | 3' 954<br>5' 354<br>3' 304 | "               |
| 201             | Ganges River No. 14<br>Ditto No. 16<br>Ditto No. 17 | 37 7 14<br>90 45 48<br>52 6 58    | 4' 115820<br>4' 335108<br>4' 232265 | 13056<br>21633<br>17075 | 2' 473<br>4' 097<br>3' 234 | "               | 214             | Ganges River No. 24<br>Ditto No. 28<br>Ditto No. 29 | 28 16 4<br>62 38 36<br>89 5 20   | 4' 126758<br>4' 399846<br>4' 451298 | 13389<br>25110<br>28268 | 2' 536<br>4' 756<br>5' 354 | "               |
| 202             | Ganges River No. 16<br>Ditto No. 17<br>Ditto No. 18 | 67 0 40<br>53 20 0<br>59 39 20    | 4' 143860<br>4' 084048<br>4' 115820 | 13927<br>12135<br>13056 | 2' 638<br>2' 298<br>2' 473 | "               | 215             | Ganges River No. 24<br>Ditto No. 29<br>Ditto No. 30 | 35 39 45<br>13 15 57<br>131 4 18 | 4' 288215<br>3' 883264<br>4' 399846 | 19418<br>7643<br>25110  | 3' 678<br>1' 448<br>4' 756 | "               |
| 203             | Ganges River No. 16<br>Ditto No. 18<br>Ditto No. 19 | 41 18 13<br>84 57 54<br>53 43 53  | 3' 997153<br>4' 175898<br>4' 084048 | 9935<br>14993<br>12135  | 1' 882<br>2' 840<br>2' 298 | "               | 216             | Ganges River No. 24<br>Ditto No. 26<br>Ditto No. 30 | 47 10 48<br>51 51 32<br>80 57 40 | 3' 852966<br>3' 883264<br>3' 982142 | 7128<br>7643<br>9397    | 1' 350<br>1' 448<br>1' 818 | "               |
| 204             | Ganges River No. 18<br>Ditto No. 19<br>Ditto No. 20 | 44 47 47<br>83 52 31<br>51 19 42  | 3' 952583<br>4' 102161<br>3' 997153 | 8966<br>12652<br>9935   | 1' 698<br>2' 396<br>1' 882 | "               | 217             | Ganges River No. 26<br>Ditto No. 30<br>Ditto No. 31 | 111 57 50<br>45 42 0<br>22 20 10 | 4' 240416<br>4' 127866<br>3' 852966 | 17395<br>13424<br>7128  | 3' 294<br>2' 542<br>1' 350 | "               |
| 205             | Ganges River No. 19<br>Ditto No. 20<br>Ditto No. 21 | 36 23 54<br>102 25 56<br>41 10 10 | 3' 907511<br>4' 123862<br>3' 952583 | 8082<br>13300<br>8966   | 1' 531<br>2' 519<br>1' 698 | "               | 218             | Ganges River No. 26<br>Ditto No. 30<br>Ditto No. 32 | 68 4 23<br>60 37 34<br>51 18 3   | 3' 928015<br>3' 900862<br>3' 852966 | 8473<br>7959<br>7128    | 1' 605<br>1' 507<br>1' 350 | "               |
| 206             | Ganges River No. 20<br>Ditto No. 21<br>Ditto No. 22 | 90 15 37<br>56 57 5<br>32 47 18   | 4' 173879<br>4' 097235<br>3' 907511 | 14924<br>12509<br>8082  | 2' 826<br>2' 369<br>1' 531 | "               | 219             | Ganges River No. 26<br>Ditto No. 31<br>Ditto No. 32 | 43 53 27<br>35 40 9<br>100 26 24 | 3' 976029<br>3' 900862<br>4' 127866 | 9463<br>7959<br>13424   | 1' 792<br>1' 507<br>2' 542 | "               |
| 207             | Ganges River No. 21<br>Ditto No. 22<br>Ditto No. 23 | 34 1 59<br>89 3 32<br>56 54 29    | 3' 998674<br>4' 250682<br>4' 173879 | 9970<br>17811<br>14924  | 1' 888<br>3' 373<br>2' 826 | "               | 220             | Ganges River No. 31<br>Ditto No. 32<br>Ditto No. 33 | 75 36 41<br>53 23 52<br>50 59 27 | 4' 071741<br>3' 990187<br>3' 976029 | 11796<br>9777<br>9463   | 2' 234<br>1' 852<br>1' 792 | "               |
| 208             | Ganges River No. 22<br>Ditto No. 23<br>Ditto No. 24 | 56 47 34<br>74 47 56<br>48 24 30  | 4' 047400<br>4' 109366<br>3' 998674 | 11153<br>12864<br>9970  | 2' 112<br>2' 436<br>1' 888 | "               | 221             | Ganges River No. 31<br>Ditto No. 33<br>Ditto No. 34 | 46 42 44<br>62 55 31<br>70 21 45 | 3' 878294<br>3' 965862<br>3' 990187 | 7556<br>9243<br>9777    | 1' 431<br>1' 751<br>1' 852 | "               |
| 209             | Ganges River No. 22<br>Ditto No. 24<br>Ditto No. 25 | 50 58 14<br>59 18 15<br>69 43 31  | 4' 027466<br>4' 071587<br>4' 109366 | 10653<br>11793<br>12864 | 2' 018<br>2' 233<br>2' 436 | "               | 222             | Ganges River No. 33<br>Ditto No. 34<br>Ditto No. 35 | 67 58 50<br>68 13 36<br>43 47 34 | 4' 005261<br>4' 006011<br>3' 878294 | 10122<br>10139<br>7556  | 1' 917<br>1' 920<br>1' 431 | "               |
| 210             | Ganges River No. 23<br>Ditto No. 24<br>Ditto No. 25 | 35 11 1<br>107 42 45<br>37 6 14   | 4' 027466<br>4' 245862<br>4' 047400 | 10653<br>17012<br>11153 | 2' 018<br>3' 336<br>2' 112 | "               | 223             | Ganges River No. 33<br>Ditto No. 35<br>Ditto No. 36 | 54 22 48<br>95 41 3<br>29 56 9   | 4' 217920<br>4' 305744<br>4' 006011 | 16517<br>20218<br>10139 | 3' 128<br>3' 829<br>1' 920 | "               |
| 211             | Ganges River No. 23<br>Ditto No. 24<br>Ditto No. 26 | 52 7 17<br>61 20 43<br>66 32 0    | 3' 982142<br>4' 028153<br>4' 047400 | 9597<br>10070<br>11153  | 1' 818<br>2' 021<br>2' 112 | "               | 224             | Ganges River No. 35<br>Ditto No. 36<br>Ditto No. 37 | 40 2 8<br>64 11 16<br>75 46 36   | 4' 039890<br>4' 185793<br>4' 217920 | 10960<br>15339<br>16517 | 2' 076<br>2' 905<br>3' 128 | "               |

| No. of Triangle | Station                                             | Corrected Plane Angle            | Distance                         |                         |                         | Theodolite used       | No. of Triangle | Station                                                 | Corrected Plane Angle            | Distance                         |                         |                         | Theodolite used       |
|-----------------|-----------------------------------------------------|----------------------------------|----------------------------------|-------------------------|-------------------------|-----------------------|-----------------|---------------------------------------------------------|----------------------------------|----------------------------------|-------------------------|-------------------------|-----------------------|
|                 |                                                     |                                  | Log. feet                        | Feet                    | Miles                   |                       |                 |                                                         |                                  | Log. feet                        | Feet                    | Miles                   |                       |
| 225             | Ganges River No. 35<br>Ditto No. 37<br>Ditto No. 38 | 54 52 47<br>42 43 43<br>82 23 30 | 4.102358<br>4.021200<br>4.185793 | 12658<br>10500<br>15339 | 2.397<br>1.989<br>2.905 | Inch 12<br>" "<br>" " | 238             | Ganges River No. 44<br>Ditto No. 45<br>Ditto No. 49     | 51 50 58<br>110 52 10<br>" "     | 4.514869<br>4.589761<br>4.092075 | 32724<br>38883<br>12362 | 6.198<br>7.364<br>2.341 | Inch 12<br>" "<br>" " |
| 226             | Ganges River No. 37<br>Ditto No. 38<br>Ditto No. 39 | 43 7 57<br>61 58 4<br>74 53 59   | 3.952477<br>4.063424<br>4.102358 | 8964<br>11572<br>12658  | 1.698<br>2.192<br>2.397 | " "<br>" "<br>" "     | 239             | Ganges River No. 47<br>Ditto No. 48<br>Ditto No. 49     | 42 15 28<br>97 11 57<br>40 32 35 | 4.129154<br>4.298046<br>4.114409 | 13463<br>10863<br>13014 | 2.550<br>3.762<br>2.465 | " "<br>" "<br>" "     |
| 227             | Ganges River No. 38<br>Ditto No. 39<br>Ditto No. 40 | 51 3 43<br>58 14 15<br>70 42 2   | 3.868477<br>3.907135<br>3.952477 | 7387<br>8075<br>8964    | 1.399<br>1.529<br>1.698 | " "<br>" "<br>" "     | 240             | Ganges River No. 48<br>Ditto No. 49<br>Mirzapur Church  | 32 28 18<br>103 23 28<br>" "     | 4.016188<br>4.274337<br>4.129154 | 10380<br>18808<br>13463 | 1.966<br>3.562<br>2.550 | " "<br>" "<br>" "     |
| 228             | Ganges River No. 39<br>Ditto No. 40<br>Ditto No. 41 | 60 3 12<br>87 25 33<br>32 31 15  | 4.075777<br>4.137574<br>3.868477 | 11906<br>13727<br>7387  | 2.255<br>2.600<br>1.399 | " "<br>" "<br>" "     | 241             | Jhusi<br>Ganges River No. 8<br>Lowana Tree              | 19 28 13<br>124 57 53<br>" "     | 3.979703<br>4.370396<br>4.221488 | 9543<br>23464<br>10053  | 1.807<br>4.444<br>3.154 | " "<br>" "<br>" "     |
| 229             | Ganges River No. 39<br>Ditto No. 41<br>Ditto No. 42 | 69 54 21<br>47 37 30<br>62 28 9  | 4.162493<br>4.058264<br>4.137574 | 14538<br>11436<br>13727 | 2.753<br>2.166<br>2.600 | " "<br>" "<br>" "     | 242             | Ganges River No. 10<br>Ditto No. 11<br>Dia Shiwala      | 29 42 7<br>91 17 45<br>" "       | 4.048328<br>4.353184<br>4.286371 | 11177<br>22552<br>19336 | 2.117<br>4.271<br>3.662 | " "<br>" "<br>" "     |
| 230             | Ganges River No. 41<br>Ditto No. 42<br>Ditto No. 43 | 55 47 49<br>60 51 44<br>63 20 27 | 4.128838<br>4.152544<br>4.162493 | 13454<br>14208<br>14538 | 2.548<br>2.601<br>2.753 | " "<br>" "<br>" "     | 243             | Ganges River No. 11<br>Ditto No. 12<br>Dia Shiwala      | 27 24 20<br>30 45 5<br>" "       | 4.002668<br>4.048328<br>4.268802 | 10062<br>11177<br>18570 | 1.906<br>2.117<br>3.517 | " "<br>" "<br>" "     |
| 231             | Ganges River No. 42<br>Ditto No. 43<br>Ditto No. 44 | 55 58 39<br>71 21 48<br>52 39 33 | 4.146907<br>4.205056<br>4.128838 | 14025<br>16035<br>13454 | 2.656<br>3.037<br>2.548 | " "<br>" "<br>" "     | 244             | Ganges River No. 11<br>Ditto No. 12<br>Kukra Shiwala    | 42 49 6<br>71 28 25<br>" "       | 4.141366<br>4.285953<br>4.268802 | 13847<br>19318<br>18570 | 2.623<br>3.659<br>3.517 | " "<br>" "<br>" "     |
| 232             | Ganges River No. 42<br>Ditto No. 43<br>Ditto No. 45 | 71 54 41<br>78 47 32<br>29 17 47 | 4.417226<br>4.430876<br>4.128838 | 26135<br>26970<br>13454 | 4.950<br>5.108<br>2.548 | " "<br>" "<br>" "     | 245             | Ganges River No. 11<br>Ditto No. 13<br>Kukra Shiwala    | 63 10 7<br>75 57 31<br>" "       | 4.249657<br>4.285953<br>4.114959 | 17769<br>19318<br>13030 | 3.365<br>3.659<br>2.468 | " "<br>" "<br>" "     |
| 233             | Ganges River No. 43<br>Ditto No. 45<br>Ditto No. 46 | 61 17 25<br>48 16 30<br>70 26 5  | 4.386087<br>4.315997<br>4.417226 | 24327<br>20701<br>26135 | 4.607<br>3.921<br>4.950 | " "<br>" "<br>" "     | 246             | Ganges River No. 14<br>Ditto No. 15<br>Garula Shiwala   | 56 16 11<br>12 41 7<br>" "       | 4.227475<br>3.649152<br>4.277549 | 16884<br>4458<br>18947  | 3.198<br>0.844<br>3.589 | " "<br>" "<br>" "     |
| 234             | Ganges River No. 43<br>Ditto No. 44<br>Ditto No. 46 | 68 43 9<br>71 20 47<br>39 56 4   | 4.308760<br>4.315997<br>4.146907 | 20359<br>20701<br>14025 | 3.856<br>3.921<br>2.656 | " "<br>" "<br>" "     | 247             | Ganges River No. 14<br>Ditto No. 15<br>Dandana Shiwala  | 23 22 39<br>30 46 42<br>" "      | 3.967294<br>4.077767<br>4.277549 | 9275<br>11961<br>18947  | 1.757<br>2.265<br>3.589 | " "<br>" "<br>" "     |
| 235             | Ganges River No. 44<br>Ditto No. 46<br>Ditto No. 47 | 51 8 42<br>62 16 9<br>66 35 9    | 4.237470<br>4.293003<br>4.308760 | 17277<br>19638<br>20359 | 3.272<br>3.719<br>3.856 | " "<br>" "<br>" "     | 248             | Ganges River No. 15<br>Ditto No. 16<br>Dandana Shiwala  | 30 52 59<br>45 21 21<br>" "      | 3.825489<br>3.967294<br>4.102480 | 6691<br>9275<br>12661   | 1.267<br>1.757<br>2.398 | " "<br>" "<br>" "     |
| 236             | Ganges River No. 46<br>Ditto No. 47<br>Ditto No. 48 | 48 4 52<br>50 51 46<br>81 3 22   | 4.114409<br>4.132441<br>4.237470 | 13014<br>13566<br>17277 | 2.465<br>2.569<br>3.272 | " "<br>" "<br>" "     | 249             | Ganges River No. 30<br>Ditto No. 31<br>Bankata Shiwala  | 26 56 33<br>18 9 20<br>" "       | 4.046379<br>3.883783<br>4.240416 | 11127<br>7652<br>17395  | 2.107<br>1.449<br>3.294 | " 18<br>" "<br>" "    |
| 237             | Ganges River No. 45<br>Ditto No. 46<br>Ditto No. 48 | 31 19 49<br>79 51 0<br>68 49 11  | 4.132441<br>4.409612<br>4.386087 | 13566<br>25681<br>24327 | 2.569<br>4.864<br>4.607 | " "<br>" "<br>" "     | 250             | Ganges River No. 30<br>Ditto No. 31<br>Misrapur Shiwala | 5 35 33<br>13 45 53<br>" "       | 3.708782<br>4.096448<br>4.240416 | 5114<br>12487<br>17395  | 0.969<br>2.365<br>3.294 | 12<br>18<br>" "       |

\* Base deduced by two sides and included angle.

| No. of Triangle | Station                                                       | Corrected Plane Angle | Distance                        |                                  |                         | No. of Triangle | Station                                         | Corrected Plane Angle            | Distance                         |                         |                          | Theodolite used  |
|-----------------|---------------------------------------------------------------|-----------------------|---------------------------------|----------------------------------|-------------------------|-----------------|-------------------------------------------------|----------------------------------|----------------------------------|-------------------------|--------------------------|------------------|
|                 |                                                               |                       | Log. feet                       | Feet                             | Miles                   |                 |                                                 |                                  | Log. feet                        | Feet                    | Miles                    |                  |
| 251             | Ganges River No. 40<br>Ditto No. 41<br>Rámpur Shiwalá         | s.<br>" "             | 19 6 48<br>59 9 58              | 3'600056<br>4'018747<br>4'075777 | 3982<br>10441<br>11906  | 263             | Marár, XI<br>Bispatia<br>Machlishahr            | 39 49 14<br>88 13 16<br>51 57 30 | 4'567049<br>4'760398<br>4'656893 | 36902<br>57597<br>45383 | 6'989<br>10'908<br>8'595 | Inch<br>24<br>12 |
| 252             | Ganges River No. 44<br>Ditto No. 47<br>Shiopur House          | s.<br>" "             | 10 10 48<br>25 27 27            | 3'775020<br>4'100990<br>4'293093 | 5957<br>14487<br>19638  | 264             | Bispatia<br>Machlishahr<br>Ketulpur             | 54 16 42<br>60 43 42<br>64 59 36 | 4'519279<br>4'550468<br>4'567049 | 33058<br>35520<br>36902 | 6'261<br>6'727<br>6'989  | "                |
| 253             | Ganges River No. 45<br>Ditto No. 46<br>Khámária Shiwalá       | h.s.<br>s.            | 16 2 15<br>127 26 17            | 4'052777<br>4'511276<br>4'386087 | 11202<br>32455<br>24327 | 265             | Machlishahr<br>Ketulpur<br>Saráia               | 57 41 25<br>58 28 34<br>63 50 1  | 4'493181<br>4'496891<br>4'519279 | 31130<br>31397<br>33058 | 5'896<br>5'946<br>6'261  | "                |
| 254             | Ganges River No. 44<br>Ditto No. 45<br>Moia N. Shiwalá        | s.<br>h.s.            | 58 32 34<br>95 13 36            | 4'377632<br>4'444858<br>4'092075 | 23858<br>27852<br>12362 | 266             | Ketulpur<br>Saráia<br>Kámpur                    | 50 16 17<br>60 8 13<br>69 35 30  | 4'407306<br>4'459463<br>4'493181 | 25545<br>28805<br>31130 | 4'838<br>5'455<br>5'896  | "                |
| 255             | Ganges River No. 45<br>Ditto No. 49<br>Moia N. Shiwalá        | h.s.<br>s.            | 15 38 34<br>33 25 1             | 4'067478<br>4'377632<br>4'514869 | 11681<br>23858<br>32724 | 267             | Saráia<br>Kámpur<br>Barauli                     | 56 32 42<br>71 24 47<br>52 2 31  | 4'431858<br>4'487261<br>4'407306 | 27031<br>30709<br>25545 | 5'119<br>5'816<br>4'838  | "                |
| 256             | Ganges River No. 44<br>Ditto No. 47<br>Moia S. Shiwalá        | s.<br>"               | 13 34 53<br>135 19 15           | 3'950770<br>4'427062<br>4'293093 | 8928<br>26734<br>19638  | 268             | Kámpur<br>Barauli<br>Jagdshpur                  | 61 27 38<br>55 35 19<br>62 57 3  | 4'425903<br>4'398622<br>4'431858 | 26663<br>25039<br>27031 | 5'050<br>4'742<br>5'119  | "                |
| 257             | Ganges River No. 46<br>Ditto No. 48<br>Bindháchal Shiwalá     | s.<br>"               | 44 44 49<br>83 30 8             | 4'084950<br>4'234593<br>4'132441 | 12160<br>17163<br>13566 | 269             | Barauli<br>Jagdshpur<br>Jaunpur Fort            | 56 10 58<br>72 13 0<br>51 36 2   | 4'451259<br>4'510490<br>4'425903 | 28266<br>32396<br>26663 | 5'353<br>6'136<br>5'050  | "                |
| 258             | Ganges River No. 47<br>Ditto No. 49<br>Mirzapur Large Shiwalá | s.<br>"               | 8 18 34<br>27 1 17              | 3'695821<br>4'193260<br>4'298046 | 4964<br>15605<br>19863  | 270             | Barauli<br>Jaunpur Fort<br>Jaunpur Masjid Dome  | 6 40 39<br>98 52 46<br>51 36 2   | 3'592207<br>4'521463<br>4'510490 | 3910<br>33225<br>32396  | 0'741<br>6'293<br>6'136  | "                |
| 259             | Ganges River No. 48<br>Ditto No. 49<br>Mirzapur Great Shiwalá | s.<br>"               | 8 28 51<br>120 44 20            | 3'408734<br>4'174234<br>4'129154 | 2563<br>14937<br>13463  | 271             | Barauli<br>Jagdshpur<br>Jaunpur Masjid Spire    | 49 28 37<br>78 43 17<br>6 42 21  | 4'411446<br>4'522080<br>4'425903 | 25790<br>33272<br>26663 | 4'884<br>6'302<br>5'050  | "                |
| 260             | Seona, IX<br>Marár, XI<br>Sathar                              | s.                    | 60 55 51<br>14 0 43             | 4'879449<br>4'321959<br>4'922748 | 75762<br>20987<br>83704 | 272             | Barauli<br>Jaunpur Fort<br>Jaunpur Masjid Spire | 6 42 21<br>99 28 39<br>139 14 30 | 3'595387<br>4'522080<br>4'510490 | 3939<br>33272<br>32396  | 0'746<br>6'302<br>6'136  | "                |
| 261             | Seona, IX<br>Sathar<br>Sarai Masjid                           | s.                    | 12 44 12<br>64 16 47            | 3'676557<br>4'287894<br>4'321959 | 4749<br>19404<br>20987  | 273             | Jaunpur Fort<br>Jaunpur Masjid Spire<br>A       | 15 55 25<br>138 38 37<br>16 4 35 | 3'971900<br>3'780325<br>3'595387 | 9373<br>6030<br>3939    | 1'775<br>1'142<br>0'746  | "                |
| 262             | Marár, XI<br>Newáda, XIII<br>Bispatia                         | s.                    | 45 27 38<br>54 30 48<br>80 1 34 | 4'599082<br>4'656893<br>4'739521 | 39727<br>45383<br>54893 | 274             | Jaunpur Fort<br>Jaunpur Masjid Dome<br>A        | 138 38 37<br>16 4 35             | 3'969886<br>3'780325<br>3'592207 | 9330<br>6030<br>3910    | 1'767<br>1'142<br>0'741  | "                |
|                 |                                                               |                       |                                 |                                  |                         | 275             | Jaunpur Fort<br>A<br>X                          | 19 43 14<br>144 32 2             | 3'450287<br>3'544919<br>3'780325 | 2820<br>3597<br>6030    | 0'534<br>0'664<br>1'142  | "                |

\* Base deduced by two sides and included angle.

| No. of Triangle           | Station                                            | Corrected Plane Angle         | Distance                         |                         |                           | Theodolite used | No. of Triangle | Station                                                | Corrected Plane Angle | Distance                         |                         |                         | Theodolite used |
|---------------------------|----------------------------------------------------|-------------------------------|----------------------------------|-------------------------|---------------------------|-----------------|-----------------|--------------------------------------------------------|-----------------------|----------------------------------|-------------------------|-------------------------|-----------------|
|                           |                                                    |                               | Log. feet                        | Feet                    | Miles                     |                 |                 |                                                        |                       |                                  |                         |                         |                 |
| 276                       | Jaunpur Fort<br>A<br>Jaunpur Jail                  | S.<br>" 37 26 25<br>27 41 10  | 3 606461<br>3 489709<br>3 780325 | 4041<br>3088<br>6030    | 0 765<br>0 585<br>1 142   | Inch 12         | 286             | Orejhar, XXIV<br>Fyzabad Great Dome<br>Sugringari Tomb | 77 46 29<br>88 19 13  | 4 275714<br>3 666452<br>4 285489 | 18867<br>4639<br>19297  | 3 573<br>0 879<br>3 655 | Inch 24<br>7    |
| 277                       | Jaunpur Fort<br>X<br>Jaunpur Church                | S.<br>" 23 35 14<br>134 56 22 | 3 583574<br>3 831301<br>3 544919 | 3833<br>6781<br>3507    | 0 726<br>1 284<br>0 664   | " "             | 287             | Orejhar, XXIV<br>Sugringari Tomb<br>Fyzabad Dome       | 63 22 29<br>97 36 19  | 4 104687<br>4 149533<br>3 666452 | 12726<br>14110<br>4639  | 2 410<br>2 672<br>0 879 | 24<br>7         |
| 278                       | Jaunpur Fort<br>Jaunpur Masjid Dome<br>Haud        | S.<br>" 19 59 27<br>20 16 49  | 3 586223<br>3 862867<br>3 592207 | 3857<br>7292<br>3910    | 0 730<br>1 381<br>0 741   | " "             | 288             | Orejhar, XXIV<br>Darsanganj<br>Fyzabad Dome            | 97 47 52<br>50 30 38  | 4 258027<br>4 149533<br>3 982508 | 18115<br>14110<br>9605  | 3 431<br>2 672<br>1 819 | 24<br>7         |
| 279                       | Jaunpur Fort<br>Haud<br>Baradari Dome              | S.<br>" 56 21 29<br>52 34 50  | 3 807430<br>3 786972<br>3 862867 | 6418<br>6123<br>7292    | 1 216<br>1 160<br>1 381   | " "             | 289             | Orejhar, XXIV<br>Oudh Temple No. 1                     | 35 20 13<br>61 13 10  | 3 550841<br>3 785775<br>3 731362 | 3555<br>6106<br>5387    | 0 673<br>1 156<br>1 020 | " "             |
| 280                       | Jaunpur Fort<br>Haud<br>Dariba Temple              | S.<br>" 15 24 25<br>50 20 34  | 3 309629<br>3 805597<br>3 862867 | 2040<br>6391<br>7292    | 0 386<br>1 210<br>1 381   | " "             | 290             | Orejhar, XXIV<br>Oudh Temple No. 1<br>Belua Bazar      | 43 8 45<br>11 16 15   | 4 275298<br>4 350567<br>3 731362 | 18849<br>22416<br>5387  | 3 570<br>4 246<br>1 020 | " "             |
| 281                       | Jaunpur Fort<br>Haud<br>Isapur Temple              | S.<br>" 57 46 55<br>50 28 10  | 3 812668<br>3 772500<br>3 862867 | 6496<br>5922<br>7292    | 1 230<br>1 122<br>1 381   | " "             | 291             | Orejhar, XXIV<br>Belua Bazar<br>Sarju River            | 78 31 28<br>42 24 40  | 4 408439<br>4 246156<br>4 350567 | 25612<br>17626<br>22416 | 4 851<br>3 338<br>4 246 | " "             |
| OUDH<br>SECONDARY SERIES. |                                                    |                               |                                  |                         |                           |                 |                 |                                                        |                       |                                  |                         |                         |                 |
| 282                       | Rahet, XXII<br>Orejhar, XXIV<br>Mao Temple         | 28 44 47<br>41 15 12          | 4 509785<br>4 646842<br>4 800685 | 32343<br>44345<br>63195 | 6 126<br>8 399<br>11 969  | 24              | 294             | Orejhar, XXIV<br>Sarju River<br>Oudh Temple No. 2      | 123 56 33<br>16 49 6  | 4 363923<br>3 900460<br>4 246156 | 23117<br>8062<br>17626  | 4 378<br>1 527<br>3 338 | " "             |
| 283                       | Rahet, XXII<br>Orejhar, XXIV<br>Fyzabad Great Dome | 16 41 27<br>53 27 25          | 4 285489<br>4 732331<br>4 800685 | 19297<br>53980<br>63195 | 3 655<br>10 223<br>11 969 | " "             | 295             | Belua Bazar<br>Sarju River<br>Maranadi                 | 112 47 7              | 4 430423<br>4 641229<br>4 468439 | 26942<br>43775<br>25612 | 5 103<br>8 291<br>4 851 | " "             |
| 284                       | Orejhar, XXIV<br>Fyzabad Great Dome<br>Darsanganj  | 83 23 52                      | 4 312662<br>3 982508             | 20543<br>9005           | 3 891<br>1 819            | " "             | 296             | Oudh Temple No. 1<br>Sarju River<br>Maranadi           | 159 12 56<br>9 4 51   | 4 430423<br>4 673299<br>4 321434 | 26942<br>47130<br>20962 | 5 103<br>8 926<br>3 970 | " "             |
| 285                       | Orejhar, XXIV<br>Darsanganj<br>Oudh Temple No. 1   | 148 31 39<br>11 12 13         | 4 160642<br>3 731362<br>3 982508 | 14476<br>5387<br>9005   | 2 742<br>1 020<br>1 819   | 24<br>7         |                 |                                                        |                       |                                  |                         |                         |                 |

J. B. N. HENNESSEY.

In charge of Computing Office.

September 1879.

AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL,  
 PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

23-N

† Of the North-East Longitudinal Series. \* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

| Name of station with azimuths of surrounding points                                                                                                                                                                                                   | No. of triangle giving distance                                                   | Name of station with azimuths of surrounding points                                                                                                                                                                                  | No. of triangle giving distance                                                               | Name of station with azimuths of surrounding points                                                                                                                                                                                     | No. of triangle giving distance                                                | Name of station with azimuths of surrounding points                                                                                                                                                                                     | No. of triangle giving distance                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| BARGAWA h.s.<br>Kasda, II<br>Dibar<br>Panjerio Hill Mark                                                                                                                                                                                              | 83<br>86<br>87                                                                    | BHAKAPURWA h.s.<br>Matura<br>Tikor, V<br>Lalganj Pagoda                                                                                                                                                                              | 172<br>172<br>179<br>173                                                                      | CHAPRI, XXIX*<br>Tatpahar<br>Tatpahar Hill Mark<br>Baragaon<br>Kumeria Peak<br>Pakera<br>Basai Gopat<br>Adhesar Hill Mark<br>Murchia, I<br>Urkutha Hill Mark<br>Gurdari Hill Mark<br>Jawan Hill Mark<br>Tendua<br>Pokra, XXXI*<br>Siwar | 68<br>70<br>89<br>67<br>78<br>73<br>85<br>1<br>63<br>65<br>61<br>83<br>1<br>66 | CHAPRI, XXIX*<br>Tatpahar<br>Tatpahar Hill Mark<br>Baragaon<br>Kumeria Peak<br>Pakera<br>Basai Gopat<br>Adhesar Hill Mark<br>Murchia, I<br>Urkutha Hill Mark<br>Gurdari Hill Mark<br>Jawan Hill Mark<br>Tendua<br>Pokra, XXXI*<br>Siwar | 68<br>70<br>89<br>67<br>78<br>73<br>85<br>1<br>63<br>65<br>61<br>83<br>1<br>66 |
| BARUPUR, VII<br>Misrapur Shiwala<br>Ganges River No. 32<br>Meja, VI<br>Ganges River No. 30<br>Bankata Shiwala<br>Ganges River No. 26<br>Ganesbpur, VIII<br>Seona, IX<br>Ganges River No. 34<br>Ganges River No. 45<br>Ganges River No. 33<br>Tikor, V | 250<br>219<br>7<br>217<br>249<br>217<br>8<br>9<br>221<br>163<br>220<br>7          | BILAUHI h.s.<br>Jigni<br>Baragaon<br>Kodali Hill Mark<br>Khamerji<br>Kesra Hill Mark<br>Baraiha (P) Tree Flag<br>Hanumana Rock<br>Sabalai<br>Baisaur Rock<br>Katra, IV<br>Naun Hill Mark<br>Murchia, I<br>Naun Temple<br>Birohi Rock | 122<br>117<br>127<br>117<br>99<br>120<br>129<br>118<br>131<br>119<br>123<br>119<br>128<br>124 | DAIA s.<br>Majgaon Hill Mark<br>Mugarikot<br>Katra, IV<br>Katra Pass                                                                                                                                                                    | 141<br>140<br>140<br>143                                                       | DAIA s.<br>Majgaon Hill Mark<br>Mugarikot<br>Katra, IV<br>Katra Pass                                                                                                                                                                    | 141<br>140<br>140<br>143                                                       |
| BASAI GOPAT h.s.<br>Chapri, XXIX*<br>Murchia, I                                                                                                                                                                                                       | 73<br>73                                                                          | BIRUHI ROCK s.<br>Jigni<br>Kodali Hill Mark<br>Bilauhi<br>Naun Temple<br>Naun Hill Mark                                                                                                                                              | 124<br>124<br>126<br>124<br>128<br>125                                                        | DARAUL h.s.<br>Kohrar<br>Kohrar Temple<br>Meja, VI                                                                                                                                                                                      | 159<br>161<br>159                                                              | DARAUL h.s.<br>Kohrar<br>Kohrar Temple<br>Meja, VI                                                                                                                                                                                      | 159<br>161<br>159                                                              |
| BEJUA BAZAR s.<br>Saru River<br>Orejhar, XXIV<br>Oudh Temple No. 1<br>Maranadi                                                                                                                                                                        | 291<br>290<br>290<br>295                                                          | BIRUA, X<br>Ramapura, XII<br>Marar, XI<br>Seona, IX<br>Ganeshpur, VIII                                                                                                                                                               | 12<br>11<br>10<br>10                                                                          | DARSANGANJ s.<br>Fyzabad Great Dome<br>Fyzabad Dome<br>Orejhar, XXIV<br>Oudh Temple No. 1                                                                                                                                               | 284<br>288<br>284<br>285                                                       | DARSANGANJ s.<br>Fyzabad Great Dome<br>Fyzabad Dome<br>Orejhar, XXIV<br>Oudh Temple No. 1                                                                                                                                               | 284<br>288<br>284<br>285                                                       |
| BHAWANIPUR h.s.<br>Bargawa<br>Tikor, V<br>Mohari<br>Pandipura<br>Ganges River No. 45<br>Ganges River No. 47<br>Mirzapur Bungalow<br>Mirzapur Court House<br>Dhanwadi Temple<br>Mirzapur Cantonment<br>Pana<br>Deopura<br>Rajapur<br>Dibar             | 89<br>167<br>49<br>46<br>48<br>57<br>53<br>52<br>47<br>55<br>44<br>41<br>43<br>39 | BISAU, XXIII<br>Nansa, XXI<br>Rahet, XXII<br>Orejhar, XXIV<br>Kumeria, XXV<br>BISPATIA s.<br>Marar, XI<br>Newada, XIII<br>Ketulpur<br>Machishahr<br>CHANDAS h.s.<br>Majgaon Hill Mark<br>Kohrar<br>Meja<br>Meja, VI                  | 23<br>23<br>24<br>25<br>262<br>262<br>264<br>263<br>155<br>154<br>156<br>154                  | DROPUA h.s.<br>Bargawa<br>Bhawaniapur<br>Pana<br>Barani Temple<br>Raja Talao Temple<br>Dibar<br>DIBAR h.s.<br>Panjerio Hill Mark<br>Pokra, XXXI*<br>Bargawa<br>Bhawaniapur<br>Rajapur<br>Deopura                                        | 40<br>41<br>44<br>58<br>59<br>40<br>37<br>36<br>36<br>39<br>42<br>40           | DROPUA h.s.<br>Bargawa<br>Bhawaniapur<br>Pana<br>Barani Temple<br>Raja Talao Temple<br>Dibar<br>DIBAR h.s.<br>Panjerio Hill Mark<br>Pokra, XXXI*<br>Bargawa<br>Bhawaniapur<br>Rajapur<br>Deopura                                        | 40<br>41<br>44<br>58<br>59<br>40<br>37<br>36<br>36<br>39<br>42<br>40           |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.



### AZIMUTHS OF STATIONS AND INTERSECTED POINTS.

[illegible]

| Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance |
|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|
| Ganges River No. 25 s.                              | 212                             | Ganges River No. 34 s.                              | 221                             | Ganges River No. 42 s.                              | 229                             | Ganges River No. 42 s.                              | 229                             |
| Ganges River No. 27 s.                              | 209                             | Ganges River No. 33 s.                              | 221                             | Ganges River No. 39 s.                              | 229                             | Ganges River No. 39 s.                              | 229                             |
| Do. No. 22 s.                                       | 210                             | Do. No. 31 s.                                       | 222                             | Do. No. 43 s.                                       | 230                             | Do. No. 43 s.                                       | 230                             |
| Do. No. 23 s.                                       | 209                             | Do. No. 35 s.                                       | 222                             | Do. No. 44 s.                                       | 231                             | Do. No. 44 s.                                       | 231                             |
| Do. No. 24 s.                                       | 209                             | Do. No. 36 s.                                       | 223                             | Do. No. 45 s.                                       | 232                             | Do. No. 45 s.                                       | 232                             |
| Ganges River No. 26 s.                              | 216                             | Ganges River No. 35 s.                              | 223                             | Ganges River No. 43 s.                              | 231                             | Ganges River No. 43 s.                              | 231                             |
| Ganges River No. 30 s.                              | 211                             | Ganges River No. 36 s.                              | 222                             | Ganges River No. 44 s.                              | 230                             | Ganges River No. 44 s.                              | 230                             |
| Do. No. 24 s.                                       | 211                             | Do. No. 33 s.                                       | 222                             | Do. No. 42 s.                                       | 230                             | Do. No. 42 s.                                       | 230                             |
| Do. No. 28 s.                                       | 217                             | Do. No. 34 s.                                       | 225                             | Do. No. 41 s.                                       | 233                             | Do. No. 41 s.                                       | 233                             |
| Do. No. 31 s.                                       | 218                             | Do. No. 38 s.                                       | 224                             | Do. No. 46 s.                                       | 238                             | Do. No. 46 s.                                       | 238                             |
| Do. No. 32 s.                                       | 218                             | Do. No. 37 s.                                       | 224                             | Do. No. 45 s.                                       | 232                             | Do. No. 45 s.                                       | 232                             |
| Ganges River No. 27 s.                              | 212                             | Ganges River No. 36 s.                              | 223                             | Ganges River No. 44 s.                              | 231                             | Ganges River No. 44 s.                              | 231                             |
| Ganges River No. 25 s.                              | 212                             | Ganges River No. 33 s.                              | 223                             | Ganges River No. 43 s.                              | 231                             | Ganges River No. 43 s.                              | 231                             |
| Do. No. 24 s.                                       | 218                             | Do. No. 35 s.                                       | 224                             | Do. No. 46 s.                                       | 234                             | Do. No. 46 s.                                       | 234                             |
| Do. No. 28 s.                                       | 213                             | Do. No. 37 s.                                       | 224                             | Moia N. Shiwala                                     | 254                             | Moia N. Shiwala                                     | 254                             |
| Ganges River No. 28 s.                              | 213                             | Ganges River No. 37 s.                              | 224                             | Moia S. Shiwala                                     | 256                             | Moia S. Shiwala                                     | 256                             |
| Ganges River No. 27 s.                              | 213                             | Ganges River No. 36 s.                              | 224                             | Ganges River No. 49 s.                              | 235                             | Ganges River No. 49 s.                              | 235                             |
| Do. No. 24 s.                                       | 214                             | Do. No. 35 s.                                       | 225                             | Do. No. 47 s.                                       | 252                             | Do. No. 47 s.                                       | 252                             |
| Do. No. 29 s.                                       | 214                             | Do. No. 38 s.                                       | 226                             | Shiupur House                                       | 164                             | Shiupur House                                       | 164                             |
| Ganges River No. 29 s.                              | 214                             | Do. No. 39 s.                                       | 226                             | Ganges River No. 45 s.                              | 49                              | Ganges River No. 45 s.                              | 49                              |
| Ganges River No. 28 s.                              | 214                             | Ganges River No. 38 s.                              | 225                             | Siwara                                              | 163                             | Siwara                                              | 163                             |
| Do. No. 24 s.                                       | 215                             | Ganges River No. 37 s.                              | 225                             | Mohari                                              | 174                             | Mohari                                              | 174                             |
| Do. No. 30 s.                                       | 215                             | Do. No. 35 s.                                       | 227                             | Tikor, V                                            | 185                             | Tikor, V                                            | 185                             |
| Ganges River No. 30 s.                              | 215                             | Do. No. 40 s.                                       | 226                             | Mara, East                                          | 163                             | Mara, East                                          | 163                             |
| Ganges River No. 24 s.                              | 215                             | Do. No. 39 s.                                       | 226                             | Kataia Hill Pagoda                                  | 232                             | Kataia Hill Pagoda                                  | 232                             |
| Ganges River No. 24 s.                              | 215                             | Ganges River No. 39 s.                              | 226                             | Ganges River No. 31 s.                              | 232                             | Ganges River No. 31 s.                              | 232                             |
| Ganges River No. 24 s.                              | 215                             | Ganges River No. 37 s.                              | 226                             | Do. No. 42 s.                                       | 232                             | Do. No. 42 s.                                       | 232                             |
| Ganges River No. 24 s.                              | 215                             | Ganges River No. 38 s.                              | 226                             | Do. No. 43 s.                                       | 232                             | Do. No. 43 s.                                       | 232                             |
| Ganges River No. 24 s.                              | 215                             | Do. No. 38 s.                                       | 226                             | Khamaria Shiwala                                    | 233                             | Khamaria Shiwala                                    | 233                             |
| Ganges River No. 24 s.                              | 215                             | Do. No. 40 s.                                       | 227                             | Ganges River No. 46 s.                              | 237                             | Ganges River No. 46 s.                              | 237                             |
| Ganges River No. 24 s.                              | 215                             | Do. No. 41 s.                                       | 228                             | Do. No. 48 s.                                       | 55                              | Do. No. 48 s.                                       | 55                              |
| Ganges River No. 24 s.                              | 215                             | Do. No. 42 s.                                       | 229                             | Mirzapur Cantonment                                 | 254                             | Mirzapur Cantonment                                 | 254                             |
| Ganges River No. 24 s.                              | 215                             | Do. No. 40 s.                                       | 227                             | Moia N. Shiwala                                     | 186                             | Moia N. Shiwala                                     | 186                             |
| Ganges River No. 24 s.                              | 215                             | Ganges River No. 40 s.                              | 227                             | Mirzapur Church                                     | 52                              | Mirzapur Church                                     | 52                              |
| Ganges River No. 24 s.                              | 215                             | Ganges River No. 38 s.                              | 227                             | Mirzapur Court House                                | 238                             | Mirzapur Court House                                | 238                             |
| Ganges River No. 24 s.                              | 215                             | Do. No. 41 s.                                       | 228                             | Ganges River No. 49 s.                              | 48                              | Ganges River No. 49 s.                              | 48                              |
| Ganges River No. 24 s.                              | 215                             | Rampur Shiwala                                      | 251                             | Paua                                                | 48                              | Paua                                                | 48                              |
| Ganges River No. 24 s.                              | 215                             | Ganges River No. 39 s.                              | 227                             | Bhawaniapur                                         | 48                              | Bhawaniapur                                         | 48                              |
| Ganges River No. 24 s.                              | 215                             | Do. No. 41 s.                                       | 227                             | Pandipura                                           | 166                             | Pandipura                                           | 166                             |
| Ganges River No. 24 s.                              | 215                             | Ganges River No. 41 s.                              | 229                             | Ganges River No. 46 s.                              | 257                             | Ganges River No. 46 s.                              | 257                             |
| Ganges River No. 24 s.                              | 215                             | Ganges River No. 42 s.                              | 251                             | Bindhachal Shiwala                                  | 235                             | Bindhachal Shiwala                                  | 235                             |
| Ganges River No. 24 s.                              | 215                             | Rampur Shiwala                                      | 228                             | Ganges River No. 47 s.                              | 233                             | Ganges River No. 47 s.                              | 233                             |
| Ganges River No. 24 s.                              | 215                             | Ganges River No. 39 s.                              | 228                             | Do. No. 45 s.                                       | 234                             | Do. No. 45 s.                                       | 234                             |
| Ganges River No. 24 s.                              | 215                             | Do. No. 40 s.                                       | 228                             | Do. No. 44 s.                                       | 234                             | Do. No. 44 s.                                       | 234                             |
| Ganges River No. 24 s.                              | 215                             | Do. No. 43 s.                                       | 230                             | Do. No. 43 s.                                       | 233                             | Do. No. 43 s.                                       | 233                             |

| Name of station with azimuths of surrounding points                                                                                                                                        | No. of triangle giving distance                           | Name of station with azimuths of surrounding points                                                                                                                                            | No. of triangle giving distance                                           | Name of station with azimuths of surrounding points                                                                                                                                                                | No. of triangle giving distance                              | Name of station with azimuths of surrounding points                                                                                                                                                                | No. of triangle giving distance                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| GANGES RIVER No. 46 s.<br>Khámárá Shiwála<br>Ganges River No. 48                                                                                                                           | 253<br>236                                                | HAUD s.<br>Bárádári Dome<br>Daríba Temple<br>Isápur Temple<br>Jaunpur Masjid Dome<br>Jaunpur Fort                                                                                              | 279<br>280<br>281<br>278<br>278                                           | KAMPUR s.<br>Saráia<br>Ketulpur<br>Jagdishpur<br>Barauli                                                                                                                                                           | 266<br>266<br>268<br>267                                     | KAMPUR s.<br>Saráia<br>Ketulpur<br>Jagdishpur<br>Barauli                                                                                                                                                           | 266<br>266<br>268<br>267                                     |
| GANGES RIVER No. 47 s.<br>Shiopur House<br>Ganges River No. 44<br>Do. No. 46<br>Do. No. 48<br>Moia S. Shiwála<br>Ganges River No. 49<br>Mirzapur Large Shiwála<br>Paua<br>Bhawanipur       | 252<br>235<br>235<br>236<br>236<br>239<br>238<br>57<br>57 | JAGDISHPUR s.<br>Barauli<br>Kámpur<br>Jaunpur Masjid Spire<br>Jaunpur Fort                                                                                                                     | 268<br>268<br>271<br>269                                                  | KAPAR h.s.<br>Bauráni<br>Tatpahár                                                                                                                                                                                  | 82<br>82                                                     | KAPAR h.s.<br>Bauráni<br>Tatpahár                                                                                                                                                                                  | 82<br>82                                                     |
| GANGES RIVER No. 48 s.<br>Bindháchal Shiwála<br>Ganges River No. 47<br>Do. No. 45<br>Do. No. 46<br>Mirzapur Church<br>Mirzapur Great Shiwála<br>Ganges River No. 49                        | 257<br>236<br>237<br>236<br>240<br>259<br>239             | JAMAURA, III<br>Murchia, I<br>Adhesar Hill Mark<br>Chauria, Hill Mark<br>Kálápatrí Hill Mark<br>Katra, IV<br>Tikor, V<br>Kasda, II                                                             | 3<br>108<br>110<br>114<br>4<br>5<br>3                                     | KAPRADI, XIX<br>Sirwára, XVIII<br>Rarauli, XX<br>Nansa, XXI<br>Dopáp, XVII                                                                                                                                         | 19<br>20<br>21<br>19                                         | KAPRADI, XIX<br>Sirwára, XVIII<br>Rarauli, XX<br>Nansa, XXI<br>Dopáp, XVII                                                                                                                                         | 19<br>20<br>21<br>19                                         |
| GANGES RIVER No. 49 s.<br>Mirzapur Large Shiwála<br>Ganges River No. 45<br>Do. No. 47<br>Do. No. 44<br>Moia N. Shiwála<br>Ganges River No. 48<br>Mirzapur Church<br>Mirzapur Great Shiwála | 258<br>238<br>259<br>238<br>255<br>239<br>240<br>259      | JAUNPUR Fort s.<br>X<br>A<br>Barauli<br>Bárádári Dome<br>Jagdishpur<br>Daríba Temple<br>Haud<br>Jaunpur Masjid Dome<br>Jaunpur Masjid Spire<br>Isápur Temple<br>Jaunpur Church<br>Jaunpur Jail | 275<br>273<br>269<br>269<br>280<br>278<br>270<br>272<br>281<br>277<br>276 | KARBARA s.<br>Murda Hill Temple<br>Pahári<br>Baragaon<br>Tatpahár                                                                                                                                                  | 97<br>96<br>95<br>95                                         | KARBARA s.<br>Murda Hill Temple<br>Pahári<br>Baragaon<br>Tatpahár                                                                                                                                                  | 97<br>96<br>95<br>95                                         |
| GURUNAGAR, XXX<br>Saibara, XLIII *<br>Bansidíla, XLV *<br>Mánápára, XXIX<br>Kopa, XXVIII                                                                                                   | 32<br>31<br>30<br>30                                      | JHUSI s.<br>Moia<br>Ganges River No. 7<br>Do. No. 8<br>Lowana Tree                                                                                                                             | 187<br>187<br>189<br>241                                                  | KASDA, II<br>Bagdari Hill Mark<br>Pokra, XXXI +<br>Ándera Peak<br>Cheropahár Peak<br>Deori Sohía Mark<br>Sanderipahár Hill Mark<br>Urkutia Hill Mark<br>Bargawa<br>Murchia, I<br>Adhesar Hill Mark<br>Jamaura, III | 60<br>2<br>74<br>76<br>71<br>69<br>62<br>83<br>2<br>104<br>3 | KASDA, II<br>Bagdari Hill Mark<br>Pokra, XXXI +<br>Ándera Peak<br>Cheropahár Peak<br>Deori Sohía Mark<br>Sanderipahár Hill Mark<br>Urkutia Hill Mark<br>Bargawa<br>Murchia, I<br>Adhesar Hill Mark<br>Jamaura, III | 60<br>2<br>74<br>76<br>71<br>69<br>62<br>83<br>2<br>104<br>3 |
| HANUMANA ROCK s.<br>Baraiba(?) Tree Flag<br>Baisaur Rock<br>Katra, IV<br>Bilauli                                                                                                           | 129<br>131<br>130<br>129                                  | JIGNT h.s.<br>Kodali Hill Mark<br>Baraiba(?) Tree Flag<br>Bilauli<br>Birohi Rock                                                                                                               | 126<br>122<br>122<br>124                                                  | KATAIA HILL PAGODA s.<br>Ganges River No. 45<br>Pándipura                                                                                                                                                          | 185<br>185                                                   | KATAIA HILL PAGODA s.<br>Ganges River No. 45<br>Pándipura                                                                                                                                                          | 185<br>185                                                   |
|                                                                                                                                                                                            |                                                           |                                                                                                                                                                                                |                                                                           | KATRA, IV<br>Bilauli<br>Kháméri<br>Hanumana Rock                                                                                                                                                                   | 119<br>80<br>130                                             | KATRA, IV<br>Bilauli<br>Kháméri<br>Hanumana Rock                                                                                                                                                                   | 119<br>80<br>130                                             |

\* Of the North-East Longitudinal Series. † Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

| Name of station with azimuths of surrounding points                                                                                                                                                                                                                                                                                                                          | No. of triangle giving distance                                                                                                                                                                                                                                                                                  | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | No. of triangle giving distance                                                                                                                                                                                                                              | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | No. of triangle giving distance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| KATRA, IV<br>Baraiha (?) Tree Flag<br>Majgaon Hill Mark<br>Bakshipahar Hill Mark<br>Katra Pass<br>Daia<br>Kohrar<br>Karaun Fort<br>Meja, VI<br>Mara Temple<br>Mara Dome<br>Mugarikot<br>Tikor, V<br>Baraunda Bridge<br>Baraunda<br>Jamaura, III<br>Garbara Temple<br>Murli<br>Chalinga Hill Mark<br>Kalapatri Hill Mark<br>Chauria Hill Mark<br>Murchia, I<br>Naun Hill Mark | 45 56 0<br>106 25 26<br>108 6 28<br>s. 134 21 58<br>s. 139 49 50<br>h.s. 147 55 1<br>s. 149 19 24<br>171 5 18.23<br>199 20 55<br>200 36 42<br>" 203 0 32<br>214 23 52.59<br>220 37 11<br>221 42 27<br>259 33 1.22<br>283 18 4<br>h.s. 299 50 41<br>305 55 18<br>320 2 1<br>322 25 20<br>327 10 50.79<br>347 3 56 | KHAMERJI h.s.<br>Machir<br>Sabkalai<br>Nagrai Rock<br>Katra, IV<br>Bilauhi<br>Taripater Rock<br>Baragaon<br>Murchia, I<br>Pahari<br>Bautrani<br>KOHRAI h.s.<br>Bakshipahar Hill Mark<br>Ramanagar Temple<br>Kohrar Temple<br>Daraul<br>Meja, VI<br>Chandas<br>Katra, IV<br>KOPA, XXVIII<br>Gurunagar, XXX<br>Manapara, XXIX<br>Sabarjot, XXVII<br>Tikeria, XXVI<br>KUMERIA, XXV<br>Bisaul, XXIII<br>Orejhar, XXIV<br>Tikeria, XXVI<br>Sabarjot, XXVII<br>LALGANJ h.s.<br>Tulsipur Pagoda<br>Pandipura<br>Siwara<br>MACHIR h.s.<br>Khamerji<br>Mau Temple<br>Mau Rock<br>Nagrai Rock<br>MACHLISHAHR s.<br>Marar, XI<br>Bispatia<br>Ketulpur<br>Saralia | 121<br>138<br>148<br>142<br>140<br>152<br>149<br>6<br>181<br>177<br>135<br>5<br>146<br>147<br>4<br>133<br>112<br>136<br>114<br>110<br>4<br>123<br>145<br>145<br>143<br>144<br>145<br>142<br>142<br>144<br>144<br>264<br>264<br>266<br>265<br>93<br>99<br>108 | h.s. 185 48 35<br>" 202 51 9<br>s. 207 26 6<br>h.s. 214 28 11<br>s. 219 19 3<br>s. 235 21 16<br>h.s. 252 49 12<br>261 47 18<br>" 268 33 43<br>" 340 4 22<br>46 10 58<br>231 36 3<br>237 37 57<br>h.s. 256 55 28<br>277 46 41<br>286 12 55<br>327 49 56<br>161 0 38.83<br>224 58 3.42<br>294 3 8.43<br>353 34 9.87<br>7 9 49.58<br>62 48 9.61<br>127 15 45.91<br>183 26 9.30<br>217 12 48<br>h.s. 219 10 5<br>324 26 56<br>h.s. 5 48 52<br>109 44 24<br>s. 123 2 46<br>306 12 14<br>90 46 56<br>s. 142 44 26<br>203 28 8<br>261 9 33 | MANAPARA, XXIX<br>Kopa, XXVIII<br>Gurunagar, XXX<br>Bansidila, XLV*<br>Sabarjot, XXVII<br>MARA EAST h.s.<br>Kusalpurwa Mark<br>Mara Dome<br>Mara Temple<br>Mara West<br>Bharatganj Pagoda<br>Birpur Hill Pagoda<br>Ganges River No. 45<br>Tikor Hill Mark<br>Tikor, V<br>MARA WEST h.s.<br>Mara Temple<br>Bharatganj Pagoda<br>Birpur Hill Pagoda<br>Mara East<br>MARANADI s.<br>Saru River<br>Oudh Temple No. 1<br>Belua Bazar<br>MARAR, XI<br>Sathar<br>Birua, X<br>Ramanapara, XII<br>Newada, XIII<br>Bispatia<br>Machlishahr<br>Seona, IX<br>MATRA s.<br>Tikor, V<br>Bhikapurwa<br>Siwara<br>Lalganj Pagoda<br>MAU ROCK s.<br>Kesra Hill Mark<br>Machir<br>Khamerji | 106<br>116<br>98<br>80<br>117<br>101<br>88<br>80<br>91<br>81<br>153<br>162<br>160<br>159<br>152<br>154<br>152<br>30<br>29<br>28<br>28<br>25<br>25<br>26<br>27<br>170<br>169<br>169<br>106<br>107<br>109<br>106<br>263<br>263<br>264<br>265 | MANAPARA, XXIX<br>Kopa, XXVIII<br>Gurunagar, XXX<br>Bansidila, XLV*<br>Sabarjot, XXVII<br>MARA EAST h.s.<br>Kusalpurwa Mark<br>Mara Dome<br>Mara Temple<br>Mara West<br>Bharatganj Pagoda<br>Birpur Hill Pagoda<br>Ganges River No. 45<br>Tikor Hill Mark<br>Tikor, V<br>MARA WEST h.s.<br>Mara Temple<br>Bharatganj Pagoda<br>Birpur Hill Pagoda<br>Mara East<br>MARANADI s.<br>Saru River<br>Oudh Temple No. 1<br>Belua Bazar<br>MARAR, XI<br>Sathar<br>Birua, X<br>Ramanapara, XII<br>Newada, XIII<br>Bispatia<br>Machlishahr<br>Seona, IX<br>MATRA s.<br>Tikor, V<br>Bhikapurwa<br>Siwara<br>Lalganj Pagoda<br>MAU ROCK s.<br>Kesra Hill Mark<br>Machir<br>Khamerji | 29<br>30<br>31<br>29<br>175<br>176<br>180<br>182<br>183<br>184<br>174<br>178<br>174<br>182<br>183<br>184<br>182<br>295<br>296<br>295<br>260<br>11<br>12<br>13<br>262<br>263<br>11<br>171<br>172<br>171<br>173<br>108<br>109<br>108 |

\* Of the North-East Longitudinal Series.

### AZIMUTHS OF STATIONS AND INTERSECTED POINTS.

29—N.

[illegible]

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

| Name of station with azimuths of surrounding points                                                                                                                                                                                                  | No. of triangles giving distance                                              | Name of station with azimuths of surrounding points                                                                                       | No. of triangles giving distance                             | Name of station with azimuths of surrounding points                                                                                                                                                                                                      | No. of triangles giving distance                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| PARIPURA, XIV<br>Rāmapura, XII<br>Nawa, XVI<br>Saitabad, XV<br>Newāda, XIII                                                                                                                                                                          | 14<br>16<br>15<br>14                                                          | RAJAPUR h.s.<br>Bargawa<br>Bhawānpur<br>Paua<br>Kusāhi Temple<br>Dibar                                                                    | 42<br>43<br>45<br>51<br>42                                   | SARJU RIVER s.<br>Orejāh, XXIV<br>Oudh Temple No. 1<br>Oudh Temple No. 2<br>Belua Bazar<br>Marānadi                                                                                                                                                      | 291<br>292<br>294<br>291<br>295                                                       |
| PARSIA s.<br>Murchia, I<br>Adhesar Hill Mark                                                                                                                                                                                                         | 105<br>105                                                                    | RAMAPURA, XII<br>Birua, X<br>Paripura, XIV<br>Newāda, XIII<br>Marār, XI                                                                   | 12<br>14<br>13<br>12                                         | SATHAR s.<br>Marār, XI<br>Sarāi Masjid<br>Seona, IX                                                                                                                                                                                                      | 260<br>261<br>260                                                                     |
| PATPARA h.s.<br>Khāmerji<br>Pahāri<br>Tatpahār                                                                                                                                                                                                       | 93<br>93<br>94                                                                | RARALI, XX<br>Sirwāra, XVIII<br>Rāhet, XXII<br>Nausa, XXI<br>Kapradī, XIX                                                                 | 20<br>22<br>21<br>20                                         | SEONA, IX<br>Ganeshpur, VIII<br>Birua, X<br>Sathar<br>Sarāi Masjid<br>Marār, XI<br>Baripur, VII                                                                                                                                                          | 9<br>10<br>260<br>261<br>11<br>9                                                      |
| PATA h.s.<br>Bhawānpur<br>Pāndipura<br>Gāndes River No. 45<br>Do. No. 47<br>Mirzapur Bungalow<br>Barani Temple<br>Rāja Takāo Temple<br>Kusāhi Temple<br>Deopura<br>Rājapur                                                                           | 44<br>46<br>48<br>57<br>54<br>58<br>59<br>51<br>44<br>45                      | SABANJOT, XXVII<br>Kumeria, XXV<br>Tikera, XXVI<br>Kopa, XXVIII<br>Mānapāra, XXIX                                                         | 27<br>27<br>28<br>29                                         | SIRAWAL h.s.<br>Murchia, I<br>Sanderipahār Hill Mark<br>Gurdari Hill Mark                                                                                                                                                                                | 86<br>86<br>87                                                                        |
| POKRA, XXXI*<br>Chapri, XXIX*<br>Jiawan Hill Mark<br>Gurdari Hill Mark<br>Adhesar Hill Mark<br>Murchia, I<br>Deori Sohā Mark<br>Tendua<br>Bargawa<br>Cheropahār Peak<br>Amdera Peak<br>Kasda, II<br>Dibar<br>Panjerio Hill Mark<br>Bagdari Hill Mark | 1<br>61<br>64<br>35<br>1<br>72<br>33<br>34<br>77<br>75<br>2<br>36<br>38<br>60 | SABKALAI h.s.<br>Khāmerji<br>Balsaur Rock<br>Bilauhi<br>Baragaon<br><br>SAIBARA, XLIII+<br>Bansidīla, XLV+<br>Gurūnagar, XXX              | 116<br>132<br>118<br>116                                     | SIRWARA, XVIII<br>Nawa, XVI<br>Raruli, XX<br>Kapradī, XIX<br>Dopāp, XVII                                                                                                                                                                                 | 18<br>20<br>19<br>18                                                                  |
| RAHET, XXII<br>Raruli, XX<br>Mao Temple<br>Fyzabad Great Dome<br>Orejāh, XXIV<br>Bisaul, XXIII<br>Nausa, XXI                                                                                                                                         | 22<br>282<br>283<br>24<br>23<br>22                                            | SAIFABAD, XV<br>Newāda, XIII<br>Paripura, XIV<br>Nawa, XVI<br>Dopāp, XVII<br><br>SARAYA s.<br>Machishahr<br>Ketulpur<br>Kāmpur<br>Barauli | 32<br>32<br>15<br>15<br>16<br>17<br>265<br>265<br>266<br>267 | SIWAR s.<br>Chapri, XXIX*<br>Kumeria Peak<br>Gurdari Hill Mark<br><br>SIWARA h.s.<br>Matura<br>Tikor, V<br>Lālganj<br>Tulsiur Pagoda<br>Ganges River No. 45<br>Pāndipura<br><br>SUGRIMGARI Tomb s.<br>Fyzabad Great Dome<br>Fyzabad Dome<br>Orejāh, XXIV | 66<br>67<br>66<br><br>171<br>164<br>169<br>170<br>164<br>165<br><br>286<br>287<br>286 |

| Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance |
|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|
| TATPATER ROCK s.                                    |                                 | TENDUA h.s.                                         |                                 | TIKOR, V                                            |                                 |
| Khánerji                                            | h.s. 55 24 49                   | Bargawa                                             | 101                             | Mara Dome                                           | 176                             |
| Baragaon                                            | " 300 15 28                     | Pokra, XXXI*                                        | 101                             | Mara East                                           | 174                             |
| Tatpahár                                            | " 354 42 45                     |                                                     | 102                             | Baripur, VII                                        | 7                               |
|                                                     |                                 |                                                     |                                 | Tikor Hill Mark                                     | 178                             |
| TATPAHAR h.s.                                       |                                 | TIKERIA, XXVI                                       |                                 | Ganges River No. 45                                 | 163                             |
| Batrání                                             | h.s. 52 59 59                   | Orejhar, XXIV                                       | 81                              | Pándipura                                           | 165                             |
| Pátpára                                             | " 113 58 10                     | Kopa, XXVIII                                        | 94                              | Bhawámpur                                           | 167                             |
| Pahári                                              | " 164 58 19                     | Sabanjot, XXVII                                     | 91                              | Bhikápurwa                                          | 172                             |
| Karbara                                             | s. 171 30 35                    | Kumeria, XXV                                        | 95                              | Siwára                                              | 164                             |
| Taripater Rock                                      | " 174 43 17                     |                                                     | 102                             | Jamaura, III                                        | 5                               |
| Baragaon                                            | h.s. 191 25 40                  | TIKOR, V                                            | 88                              | Matura                                              | 171                             |
| Murchia, I                                          | 234 38 47                       | Katra, IV                                           | 68                              |                                                     |                                 |
| Chapri, XXIX*                                       | 303 36 45                       | Sansárpur Hill Mark                                 | 68                              |                                                     |                                 |
| Kapar                                               | " 355 35 24                     | Majgaon Hill Mark                                   | 82                              |                                                     |                                 |
|                                                     |                                 | Kusalpurwa Mark                                     |                                 |                                                     |                                 |
|                                                     |                                 | Meja, VI                                            |                                 |                                                     |                                 |
|                                                     |                                 | Mara Temple                                         |                                 |                                                     |                                 |
| TENDUA h.s.                                         |                                 |                                                     | 33                              |                                                     |                                 |
| Chapri, XXIX*                                       | 53 44 50                        |                                                     |                                 |                                                     |                                 |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

October 1879.

J. B. N. HENNESSEY,  
In charge of Computing Office.

## GURWANI MERIDIONAL SERIES.

## CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— $\lambda$  stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically,  $H_s$  for the Height when found by spirit leveling, and  $h$  for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of  $\lambda$  and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c., secondary stations by the letters h.s. and s. The names in italics are those of the territories, states or districts in which the stations or points are situated.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                         | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                             | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A s.<br/>(<i>Jaunpur</i>) On mound, about <math>\frac{1}{4}</math> a mile S. of Umarpur and at the same distance W. of Jaunpur cantonment.</p> <p style="text-align: center;">o ' "</p> <p><math>\lambda</math> 25 44 00.07<br/>L 82 43 21.19<br/>Nos. 273, 274</p>                                                              | <p>Amlauti Tree Flag.<br/>(<i>Allahabad</i>) In old fort.</p> <p style="text-align: center;">o ' "</p> <p><math>\lambda</math> 25 19 5<br/>L 82 11 54</p>                                                                                                               | <p>Bahádurgarh Fort s.<br/>(<i>Allahabad</i>) Near Ním tree in old fort, 0.8 of a mile N.E. of Harbaupur and 1.1 miles S.E. of Surwadi village.</p> <p style="text-align: center;">o ' "</p> <p><math>\lambda</math> 25 35 57.08<br/>L 82 10 57.72</p> |
| <p>a s.<br/>(<i>Fyzabad</i>) On bank of a small nadi, about <math>1\frac{1}{4}</math> miles N.E. of Orejhar principal station, <math>\frac{3}{4}</math> of a mile N. of road from Tanda to Oudh and <math>\frac{1}{4}</math> of a mile S.E. of Oudh city.</p> <p><math>\lambda</math> 26 47 29.91<br/>L 82 15 30.22<br/>No. 289</p> | <p>Badra Sayyid's Tomb.<br/>(<i>Allahabad</i>)</p> <p><math>\lambda</math> 25 27 16<br/>L 81 57 13</p>                                                                                                                                                                  | <p>Baisaur Rock s.<br/>(<i>Mirzapur</i>) On E. side of the high road to Mau, 0.8 of a mile N.E. of the village so called and 1.6 miles S. of Lauridar.</p> <p><math>\lambda</math> 24 49 30.11<br/>L 82 10 6.71<br/>Nos. 131, 132</p>                  |
| <p>Adhesar Hill Mark.<br/>(<i>Mirzapur</i>) On a detached hill N. of the Kaimúr range called Adhesar Fort, about <math>1\frac{1}{4}</math> miles S.E. of Járkul Lower and <math>2\frac{1}{4}</math> miles S.W. of Baruhau village.</p> <p><math>\lambda</math> 24 37 37.04<br/>L 82 21 23.05<br/>Nos. 35, 103, 104</p>              | <p>Bagdara s.<br/>(<i>Baghelkhand, Rewah State</i>) On pagoda, 11.2 feet S. of the spike, about <math>\frac{1}{4}</math> a mile S.E. of village of the same name and at the same distance N.E. of Káround.</p> <p><math>\lambda</math> 24 38 2.97<br/>L 82 32 19.49</p> | <p>Bakshipahár Hill Mark.<br/>(<i>Baghelkhand, Rewah State</i>) On the highest point of hill E. of Sohági village.</p> <p><math>\lambda</math> 24 57 56.05<br/>L 81 48 14.44<br/>No. 148</p>                                                           |
| <p>Ámdera Peak.<br/>(<i>Baghelkhand, Rewah State</i>) Appertaining to the great range running N.E. from Gurdari Hill Mark.</p> <p><math>\lambda</math> 24 27 17<br/>L 82 35 6<br/>Nos. 74, 75</p>                                                                                                                                   | <p>Bagdari Hill Mark.<br/>(<i>Baghelkhand, Rewah State</i>) On hill peak in the jungle, 5 miles N.E. of Pokra.</p> <p><math>\lambda</math> 24 19 51.21<br/>L 82 35 52.82<br/>No. 60</p>                                                                                 | <p>Banjári Fort s.<br/>(<i>Mirzapur</i>) On W. face of old fort, 0.4 of a mile E. of Indrawar village.</p> <p><math>\lambda</math> 24 48 46.91<br/>L 82 16 46.04</p>                                                                                   |



| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Bankáta Shiwála,<br/>(Mirzapur) Spire.</p> <p>λ 25 15 58.4<br/>L 82 17 59.9<br/>No. 249</p> <p>Bansídila, XLV.*<br/>(Vide page 8—N.)</p> <p>λ 27 24 3.24<br/>L 82 19 17.62<br/>H 377<br/>h 20<br/>No. 31</p> <p>Bara s.<br/>(Allahabad) On right bank of the Ganges, and N. of village of the same name.</p> <p>λ 25 18 9.48<br/>L 82 11 57.96</p> <p>Bárádari Dome,<br/>(Jaunpur) Kalas, situated on right bank of the Gumti river.</p> <p>λ 25 44 51.9<br/>L 82 42 43.0<br/>No. 279</p> <p>Baragaon h.s.<br/>(Baghelkhand, Rewah State) On the Kaimúr range, about <math>\frac{3}{4}</math> of a mile N.E. of village of the same name, and 1 mile N.W. of Sajwanah.</p> <p>λ 24 34 48.94<br/>L 82 9 30.74<br/>Nos. 88, 89, 90</p> <p>Baragaon Temple.<br/>(Baghelkhand, Rewah State) White temple W. of village.</p> <p>λ 24 58 28.1<br/>L 81 48 16.0</p> <p>Baraiha (?) Tree Flag.<br/>(Baghelkhand, Rewah State) West of road to Mau.</p> <p>λ 24 45 15<br/>L 82 5 50<br/>Nos. 120, 121</p> <p>Baraini Temple.<br/>(Mirzapur) White pointed temple in Mirzapur.</p> <p>λ 25 12 31.6<br/>L 82 43 59.7<br/>No. 58</p> <p>Barauli s.<br/>(Jaunpur) On S.W. bastion of an old fort, about <math>\frac{1}{4}</math> of a mile S. of village of the same name, and 1.1 miles S.W. of Sarwarpati.</p> <p>λ 25 42 41.20<br/>L 82 38 27.31<br/>No. 267</p> | <p>Baraunda Bridge s.<br/>(Mirzapur) Mark W. of the road, and 20 yards N. of bridge over the Belan river.</p> <p>λ 24 56 56.51<br/>L 82 17 53.99<br/>No. 146</p> <p>Baraunda s.<br/>(Mirzapur) On S. bank of the Dherawa tank near road.</p> <p>λ 24 57 11.15<br/>L 82 18 21.81<br/>No. 147</p> <p>Bardi s.<br/>(Baghelkhand, Rewah State) Over gateway of fort, on right bank of the Gopat river, about <math>\frac{1}{4}</math> a mile S. W. of village of the same name, and 1 mile N.E. of Sunbarsa.</p> <p>λ 24 32 35.48<br/>L 82 25 0.31<br/>No. 85</p> <p>Bargawa h.s.<br/>(Baghelkhand, Rewah State) On the Kaimúr range, <math>1\frac{1}{4}</math> miles N.W. of Harma village, and <math>2\frac{1}{4}</math> miles S.W. of upper Bargawa: the Son river flows <math>\frac{1}{4}</math> a mile south of the station.</p> <p>λ 24 32 40.41<br/>L 82 32 49.29<br/>Nos. 84, 88, 84</p> <p>Baría s.<br/>(Mirzapur) On S.E. corner of tank, about <math>\frac{1}{4}</math> a mile S.W. of village of the same name, and at the same distance N.E. of Jhagaha.</p> <p>λ 24 37 25.94<br/>L 82 26 23.85</p> <p>Baripur, VII.<br/>(Vide page 5—N.)</p> <p>λ 25 16 32.49<br/>L 82 19 55.18<br/>H<sub>s</sub> 320.82†<br/>h 30<br/>No. 7</p> <p>Basái Gopat h.s.<br/>(Baghelkhand, Rewah State) On a conical hill on the right bank of the Gopat river, and <math>\frac{1}{4}</math> a mile W. of Basái village.</p> <p>λ 24 26 50.68<br/>L 82 16 59.20<br/>No. 73</p> <p>Batawa Building.<br/>(Mirzapur)</p> <p>λ 25 8 35.9<br/>L 82 51 15.6</p> | <p>Bautráni h.s.<br/>(Baghelkhand, Rewah State) About <math>1\frac{1}{4}</math> miles W. of Dáuri, and 1 mile N. of Dhornai nadi.</p> <p>λ 24 20 35.96<br/>L 82 1 50.70<br/>No. 81</p> <p>Belan and Aud Junction s.<br/>(Mirzapur) On bank.</p> <p>λ 24 54 22.57<br/>L 82 19 4.55</p> <p>Belharia Ghat Flag.<br/>(Fyzabad) At Rája Dasharath's Samádh.</p> <p>λ 26 42 49<br/>L 82 18 41</p> <p>Belua Bazar s.<br/>(Basti) Opposite zamíndár's house in village, and <math>\frac{1}{4}</math> a mile N.W. of Hanumanpur; thána and pargana Amorha.</p> <p>λ 26 48 35.68<br/>L 82 18 15.58<br/>No. 290</p> <p>Bháratganj Pagoda.<br/>(Allahabad) Spire of the largest and N.W. pagoda.</p> <p>λ 25 6 59.3<br/>L 82 18 54.9<br/>No. 183</p> <p>Bhawánpur h.s.<br/>(Mirzapur) Also called Bhowti; on great hill forming S. boundary of the Bind hills.</p> <p>λ 24 59 13.30<br/>L 82 36 21.40<br/>Nos. 89, 167, 168</p> <p>Bhíkápurwa h.s.<br/>(Mirzapur) On flat rocks 150 yards N.E. of the village, about <math>\frac{1}{4}</math> of a mile N.E. of Salura and 2 miles W. of Ránibári; pargana Kantit.</p> <p>λ 25 3 17.71<br/>L 82 22 58.17<br/>No. 172</p> <p>Bijauli s.<br/>(Allahabad) On left bank of the Ganges, and 0.2 of a mile S.E. of the village.</p> <p>λ 25 18 9.98<br/>L 82 15 13.90</p> <p>Bilauhi h.s.<br/>(Baghelkhand, Rewah State) On Drummondganj range, N.W. of Naun village.</p> <p>λ 24 46 32.77<br/>L 82 11 6.71<br/>Nos. 117, 118, 119</p> |

\* Of the North-East Longitudinal Series.

† This height refers to the mark-stone let into the upper surface of the pillar.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                   | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Bind Range A s.</b><br><i>(Allahabad)</i> On the Bind range, about $\frac{1}{2}$ of a mile N.W. of Kurki village; thána Bháratganj, pargana Khairagarh.<br>$\lambda$ 25 7 18.35<br>$L$ 82 10 59.10                                                         | <b>Bisaul, XXIII.</b><br><i>(Vide page 7—N.)</i><br>$\lambda$ 26 40 37.38<br>$L$ 82 23 21.61<br>$H_s$ 342.00*<br>$h$ 24<br>Nos. 23                                                                                                                                         | <b>Daia s.</b><br><i>(Allahabad)</i> On staircase of Rája's house, about a mile N.E. of Daia Fort.<br>$\lambda$ 24 55 15.68<br>$L$ 82 8 3.58<br>Nos. 140, 141                                                            |
| <b>Bind Range B s.</b><br><i>(Allahabad)</i> About $\frac{1}{2}$ a mile S.E. of Chapra and at the same distance N. of Urarupur village; thána Bháratganj, pargana Khairagarh.<br>$\lambda$ 25 7 3.81<br>$L$ 82 14 27.13                                       | <b>Bispattia s.</b><br><i>(Jaunpur)</i> On S. bank of tank adjoining the village so called, about $\frac{1}{2}$ of a mile E. of Boji Sarái village, 0.7 of a mile N.E. of Tarsai, and 1.4 miles S.E. of Sultanpur.<br>$\lambda$ 25 46 0.67<br>$L$ 82 23 11.39<br>Nos. 262  | <b>Damdama Shiwála,</b><br><i>(Allahabad)</i> Spiro.<br>$\lambda$ 25 18 46.3<br>$L$ 82 7 31.6<br>Nos. 247, 248                                                                                                           |
| <b>Bind Range C s.</b><br><i>(Allahabad)</i> On the Bind range, about $1\frac{1}{4}$ miles N. of Rámpur, and $2\frac{1}{4}$ miles N.W. of Unchadeh village; thána Bháratganj, pargana Khairagarh.<br>$\lambda$ 25 3 23.54<br>$L$ 82 13 55.39                  | <b>Chalinga Hill Mark.</b><br><i>(Mirzapur)</i> On N.E. point of a remarkable projection of the Kaimúr range, and 3 miles S.E. of Katra principal station.<br>$\lambda$ 24 49 6.75<br>$L$ 82 14 45.87<br>Nos. 136, 137                                                     | <b>Daraul h.s.</b><br><i>(Allahabad)</i> On the Bind range, 0.4 of a mile W. of the village so called.<br>$\lambda$ 25 9 34.11<br>$L$ 82 6 0.80<br>Nos. 159                                                              |
| <b>Bind Range D s.</b><br><i>(Allahabad)</i> On the Bind range, about $1\frac{1}{2}$ miles N.W. of Deori; thána Bháratganj, pargana Khairagarh.<br>$\lambda$ 25 4 39.37<br>$L$ 82 11 24.93                                                                    | <b>Chandas h.s.</b><br><i>(Allahabad)</i> On Bind hills, about $\frac{1}{2}$ of a mile E. of village of that name, and $\frac{1}{2}$ of a mile N.E. of Bháia.<br>$\lambda$ 25 6 49.53<br>$L$ 82 5 45.33<br>Nos. 154, 155                                                   | <b>Dariba Temple,</b><br><i>(Jaunpur)</i> Spiro.<br>$\lambda$ 25 45 33.8<br>$L$ 82 42 55.7<br>Nos. 280                                                                                                                   |
| <b>Bindháchal Shiwála,</b><br><i>(Mirzapur)</i> Spiro.<br>$\lambda$ 25 9 48.0<br>$L$ 82 33 6.6<br>Nos. 257                                                                                                                                                    | <b>Chandpára Temple.</b><br><i>(Allahabad)</i> Spiro of a very remarkable temple.<br>$\lambda$ 25 29 25.2<br>$L$ 82 10 8.5                                                                                                                                                 | <b>Darsanganj s.</b><br><i>(Fyzabad)</i> On tower at W. face of the enclosure wall in the bazar of the same name, and $\frac{1}{2}$ a mile S. of Chirai village.<br>$\lambda$ 26 45 22.30<br>$L$ 82 14 55.81<br>Nos. 284 |
| <b>Birohi Rock s.</b><br><i>(Baghelkhand, Rewah State)</i> On the Drummondganj range, 0.5 of a mile N. of village so called, 1.1 miles S.E. of Misragoon, and 1.6 miles N.E. of Pataira village.<br>$\lambda$ 24 43 19.15<br>$L$ 82 11 10.30<br>Nos. 124, 125 | <b>Chapri, XXIX.†</b><br><i>(Vide page 3—N.)</i><br>$\lambda$ 24 18 46.71<br>$L$ 82 16 13.30<br>$H$ 1862<br>$h$ 3<br>Nos. 1                                                                                                                                                | <b>Deopura h.s.</b><br><i>(Mirzapur)</i> About $3\frac{1}{2}$ miles S.W. of Rámpur Saktesgarh.<br>$\lambda$ 24 56 27.54<br>$L$ 82 49 25.89<br>Nos. 40, 41                                                                |
| <b>Birpur Hill Pagoda,</b><br><i>(Allahabad)</i> Dome.<br>$\lambda$ 25 8 0.9<br>$L$ 82 19 37.4<br>Nos. 184                                                                                                                                                    | <b>Chaunia Hill Mark.</b><br><i>(Mirzapur)</i> On E. face of the Drummondganj range and near Debaaur pass. About $2\frac{1}{4}$ miles E.S.E. of Lohri village, and $1\frac{1}{4}$ miles N.N.E. of a paka tank.<br>$\lambda$ 24 42 31.37<br>$L$ 82 19 9.48<br>Nos. 110, 111 | <b>Deori Sohía Mark.</b><br><i>(Baghelkhand, Rewah State)</i> On a small height, 2 miles N.W. of village of the same name.<br>$\lambda$ 24 25 28.87<br>$L$ 82 29 14.21<br>Nos. 71, 72                                    |
| <b>Birua, X.</b><br><i>(Vide page 5—N.)</i><br>$\lambda$ 25 31 19.96<br>$L$ 82 6 46.77<br>$H$ 346<br>$h$ 30<br>Nos. 10                                                                                                                                        | <b>Cheropahár Peak.</b><br><i>(Baghelkhand, Rewah State)</i> Appertaining to the great range running N.E. from Gurdari Hill Mark.<br>$\lambda$ 24 27 24<br>$L$ 82 33 23<br>Nos. 76, 77                                                                                     | <b>Dhamawa Temple.</b><br><i>(Fyzabad)</i><br>$\lambda$ 26 47 7.2<br>$L$ 82 1 31.4                                                                                                                                       |
|                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                            | <b>Dhanipur Factory,</b><br><i>(Allahabad)</i> Eastern chimney of Mr. Griffith's factory.<br>$\lambda$ 25 17 45<br>$L$ 82 8 35                                                                                           |

\* This height refers to the upper mark-stone of the tower and was determined as follows. The point levelled to was on a paka brick imbedded in earth down the N.W. side of the column of which the height = 326.16 feet and to this was added 15.84 feet (the height of the upper mark-stone of tower above this brick).  
† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

| Name of station, district, description,<br>• co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Dhanwāli Temple.<br/>(Mirzapur) S. of village of the same name:<br/>" " "</p> <p>λ 25 2 41.9<br/>L 82 36 43.9<br/>No. 47</p> <p>Dia Shiwāla,<br/>(Allahabad) Spire.<br/>λ 25 19 7.1<br/>L 82 2 9.8<br/>Nos. 242, 243</p> <p>Dibar h.s.<br/>(Mirzapur) About 2½ miles N.E. of Purwa, and 1½ miles N. of Khadra village.<br/>λ 24 38 25.06<br/>L 82 55 11.50<br/>No. 36</p> <p>Dopāp, XVII.<br/>(Vide page 6—N.)<br/>λ 26 10 42.83<br/>L 82 19 10.73<br/>H 334<br/>h 24<br/>No. 17</p> <p>Fyzabad Dome,<br/>(Fyzabad) Of Sirāj-Ud-daula's tomb.<br/>λ 26 46 46.6<br/>L 82 11 59.4<br/>Nos. 287, 288</p> <p>Fyzabad Great Dome.<br/>(Fyzabad) Or Queen's tomb.<br/>λ 26 45 56.3<br/>L 82 11 12.3<br/>No. 283</p> <p>Fyzabad Masjid,<br/>(Fyzabad) N. minaret.<br/>λ 26 47 0.5<br/>L 82 12 23.2</p> <p>Fyzabad Masjid,<br/>(Fyzabad) S. minaret.<br/>λ 26 46 59.9<br/>L 82 12 23.3</p> <p>Ganeshpur, VIII.<br/>(Vide page 5—N.)<br/>λ 25 20 4.76<br/>L 82 8 24.59<br/>H 323.78*<br/>h 3.0<br/>No. 8</p> | <p>Ganges River No. 7 s.<br/>(Allahabad) Also called Nika s.; on N. bund of a tank, 0.3 of a mile S.E. of village of the same name, 1 mile off the left bank of the Ganges, and 0.4 of a mile E. of Chhatnagh village.<br/>" " "</p> <p>λ 25 24 35.38<br/>L 81 57 56.51<br/>No. 187</p> <p>Ganges River No. 8 s.<br/>(Allahabad) Also called Nimbi No. 1 s.; on N. bank, close to it the river forms two channels, the larger of which flows under Lowanna and the smaller by the station, 0.7 of a mile W. of village of the same name. Marked by a mound 3 feet in height.<br/>λ 25 23 14.54<br/>L 81 58 4.49<br/>Nos. 188, 189</p> <p>Ganges River No. 9 s.<br/>(Allahabad) Also called Lowanna s. or Lowen s.; on right bank, about 50 yards N. of village of the same name, and 1½ miles E. of the Grand Trunk Road from Mirzapur to Allahabad.<br/>λ 25 21 59.47<br/>L 81 57 22.52<br/>No. 190</p> <p>Ganges River No. 10 s.<br/>(Allahabad) Also called Chebaia s.; on ruins of a Garhi on N. bank, 0.3 of a mile S. of the village so called, and 0.7 of a mile S.E. of Sihora.<br/>λ 25 22 22.13<br/>L 82 0 9.99<br/>Nos. 191</p> <p>Ganges River No. 11 s.<br/>(Allahabad) Also called Munia s.; on right bank, 0.3 of a mile S.E. of village of the same name.<br/>λ 25 19 10.60<br/>L 82 0 8.04<br/>Nos. 192, 193</p> <p>Ganges River No. 12 s.<br/>(Allahabad) Also called Hindūpura s.; on a small height E. of village of that name which is composed of half a dozen of straw-built houses. It is situated a little above the confluence of two channels of the river formed near Nimbi.<br/>λ 25 20 29.98<br/>L 82 3 10.63<br/>No. 194</p> <p>Ganges River No. 13 s.<br/>(Allahabad) Also called Dia s.; on S. bank and at N. extremity of village of the same name. A platform 4 feet in height denotes the station.<br/>λ 25 19 22.34<br/>L 82 2 29.48<br/>Nos. 195, 196</p> | <p>Ganges River No. 14 s.<br/>(Allahabad) Also called Babura s.; on right bank, 0.5 of a mile N.W. of village of the same name, 0.8 of a mile E. of Kotaha, and 0.7 of a mile S. of Kajuraha village. Marked by a mound of earth 6 feet in height.<br/>" " "</p> <p>λ 25 18 21.94<br/>L 82 5 23.98<br/>No. 197</p> <p>Ganges River No. 15 s.<br/>(Allahabad) Also called Ganeshpur s.; about 500 yards N.N.W. of principal station of the same name, ¼ of a mile E. of Ganeshpur village, and 1 mile S. W. of Katha: a nala is about 100 yards W. of the station.<br/>λ 25 20 10.22<br/>L 82 8 12.67<br/>Nos. 198, 199</p> <p>Ganges River No. 16 s.<br/>(Allahabad) Also called Dhanipur s.; on N. bank, a made-road from Sirsa to Saidabad passes 0.15 of a mile W., 0.4 of a mile S.W. of Panditpur Mat, 0.2 of a mile S. of the village so called, and 0.5 of a mile N. of Bārpur village.<br/>λ 25 18 5.70<br/>L 82 8 29.21<br/>No. 200</p> <p>Ganges River No. 17 s.<br/>(Allahabad) Also called Sirsa s.; immediately above S. bank and at E. extremity of the village, about ¼ a mile N. of the Grand Trunk Road from Mirzapur to Allahabad, and at the same distance W. of Chulwa village.<br/>λ 25 15 56.81<br/>L 82 8 17.41<br/>No. 201</p> <p>Ganges River No. 18 s.<br/>(Allahabad) Also called Pakri Sawār s.; on remains of a mud fort on S. bank of the river flowing at its base, 0.3 of a mile W. of Pakri, 0.2 of a mile N.W. of Sawār, and 0.7 of a mile N.E. of Dubapur.<br/>λ 25 17 9.73<br/>L 82 10 26.23<br/>No. 202</p> <p>Ganges River No. 19 s.<br/>(Allahabad) Also called Bhainsāsur s.; so called from an image of a buffalo placed there, situated on N.W. angle of fort of the same name, 0.3 of a mile N. of Mowa, 1.0 mile S.E. of Dama Singhpur, and 0.3 of a mile E. of Ahir-ka-purwa.<br/>λ 25 18 40.50<br/>L 82 11 8.06<br/>No. 203</p> <p>Ganges River No. 20 s.<br/>(Allahabad) Also called Parānīpur s.; on S. bank, 0.5 of a mile N. of the village of that name, and 0.6 of a mile N.W. of Kuraura. Marked by a mound 5 feet in height.<br/>λ 25 17 57.64<br/>L 82 12 33.64<br/>No. 204</p> |

\* This height refers to the mark-stone at 27 feet above the ground i.e. at 3 feet below the original upper surface of the pillar.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Ganges River No. 21 s.<br/>(Allahabad) Also called Dachágir s.; on remains of a very remarkable old fort on N. edge of the Ganges, and 0.2 of a mile W. of village of the same name.</p> <p>λ 25 18 57.78<br/>L 82 13 31.77<br/>No. 205</p>                                                                                                                    | <p>Ganges River No. 28 s.<br/>(Allahabad) Also called Mahewa s.; on S. bank of the river and immediately above it, 0.2 of a mile E. of village of the same name, 0.1 of a mile N.W. of Dingarpur, and 0.7 of a mile S. of Tulsī village.</p> <p>λ 25 10 36.50<br/>L 82 16 50.33<br/>No. 213</p> | <p>Ganges River No. 35 s.<br/>(Mirzapur) Also called Son-ka-pura s.; on left bank, 0.2 of a mile S. of village of that name, 0.5 of a mile S.W. of Indar, and 0.9 of a mile N. of Simaid. A platform 10 feet high indicates the station.</p> <p>λ 25 15 3.06<br/>L 82 22 46.30<br/>No. 222</p> |
| <p>Ganges River No. 22 s.<br/>(Allahabad) One mile from the right bank, 0.9 of a mile N.E. of Kesopati, and at the same distance E. of Rasauli village. A mound 6 feet high defines the station.</p> <p>λ 25 16 35.44<br/>L 82 14 15.63<br/>No. 206</p>                                                                                                           | <p>Ganges River No. 29 s.<br/>(Mirzapur) Also called Chachúa s.; on old Garhi W. of village so called, and 200 yards from S. edge of the river.</p> <p>λ 25 11 54.94<br/>L 82 18 47.88<br/>No. 214</p>                                                                                          | <p>Ganges River No. 36 s.<br/>(Mirzapur) Also called Gaura s.; the river flows 100 yards N. of the station, the village of Gaura from which it is named lies 0.2 of a mile E.</p> <p>λ 25 12 19.44<br/>L 82 22 45.86<br/>No. 223</p>                                                           |
| <p>Ganges River No. 23 s.<br/>(Allahabad) Also called Tela s.; on left bank of and just above the river, about <math>\frac{1}{4}</math> of a mile N. of village of the same name, and <math>\frac{3}{4}</math> of a mile S. of Kuni. A mound 10 feet high denotes the station; thána Handia, pargana Kiwái.</p> <p>λ 25 17 3.60<br/>L 82 15 59.74<br/>No. 207</p> | <p>Ganges River No. 30 s.<br/>(Mirzapur) On left bank, 0.6 of a mile N. of Dig village. A mound 8 feet high marks the station.</p> <p>λ 25 14 50.81<br/>L 82 17 22.19<br/>Nos. 215, 216</p>                                                                                                     | <p>Ganges River No. 37 s.<br/>(Mirzapur) Also called Nimbi No. 2 s.; on right bank, 0.2 of a mile N. of the village of that name, and the same distance S. of Arjampur. A platform 6 feet high defines the station.</p> <p>λ 25 13 6.46<br/>L 82 24 33.44<br/>No. 224</p>                      |
| <p>Ganges River No. 24 s.<br/>(Mirzapur) Also called Khemápur s.; on N. bund of a tank between the villages of Khemápur and Sujanganj, from the latter of which it is distant 0.3 of a mile N.W., 1.0 mile S.W. of Chakia, and 1.3 miles N.E. of Dugna village.</p> <p>λ 25 15 13.14<br/>L 82 16 2.64<br/>No. 208</p>                                             | <p>Ganges River No. 31 s.<br/>(Same as Baripur VII, which see).</p> <p>No. 217</p>                                                                                                                                                                                                              | <p>Ganges River No. 38 s.<br/>(Mirzapur) Also called Dhanipati s.; on N. bank, 0.2 of a mile N. of village of the same name, 0.7 of a mile E. of Duhia, and 0.4 of a mile S.W. of Kedarapura.</p> <p>λ 25 15 11.70<br/>L 82 24 40.29<br/>No. 225</p>                                           |
| <p>Ganges River No. 25 s.<br/>(Allahabad) On S. bank, 0.6 of a mile W. of Kanjara, at the same distance N. of Unaur, and 0.8 of a mile E. of Chupor. A platform 10 feet high marks the station.</p> <p>λ 25 14 38.64<br/>L 82 14 12.98<br/>Nos. 209, 210</p>                                                                                                      | <p>Ganges River No. 32 s.<br/>(Mirzapur) On right bank, 1.2 miles S.W. of Misra-pur village. Marked by a platform 3 feet high.</p> <p>λ 25 15 21.22<br/>L 82 18 48.21<br/>Nos. 218, 219</p>                                                                                                     | <p>Ganges River No. 39 s.<br/>(Mirzapur) Also called Nandni s. or Nandui s.; on a mound on right bank, 0.3 of a mile E. of the village so called, and 0.5 of a mile S.W. of Bamani.</p> <p>λ 25 14 26.12<br/>L 82 26 4.08<br/>No. 226</p>                                                      |
| <p>Ganges River No. 26 s.<br/>(Mirzapur) Also called Bankáta s.; on left bank, 0.2 of a mile W. of village of that name. A platform 9 feet in height defines the station.</p> <p>λ 25 16 0.71<br/>L 82 17 33.17<br/>No. 211</p>                                                                                                                                   | <p>Ganges River No. 33 s.<br/>(Mirzapur) Also called Dagaui s.; on right bank, 0.1 of a mile S.W. of the village from which the station is named. A platform 6 feet high denotes the station.</p> <p>λ 25 15 13.25<br/>L 82 20 56.42<br/>No. 220</p>                                            | <p>Ganges River No. 40 s.<br/>(Mirzapur) Also called Birojpur s.; immediately on N. bank, and 0.4 of a mile E. of Birasapur village.</p> <p>λ 25 15 39.29<br/>L 82 26 2.86<br/>No. 227</p>                                                                                                     |
| <p>Ganges River No. 27 s.<br/>(Allahabad) Also called Kotri s.; on S. bank of the river and 200 yards from it, 0.2 of a mile S.W. of the village of that name, 0.4 of a mile N.E. of Achola, and 0.8 of a mile E. of Suria village.</p> <p>λ 25 12 57.86<br/>L 82 14 4.38<br/>No. 212</p>                                                                         | <p>Ganges River No. 34 s.<br/>(Mirzapur) On S. bank, 0.7 of a mile N.W. of Ojapura, 0.3 of a mile S.W. of Madanpura, and 0.5 of a mile N.E. of Berwa. A mound 4 feet high indicates the station.</p> <p>λ 25 16 19.44<br/>L 82 21 34.85<br/>No. 221</p>                                         | <p>Ganges River No. 41 s.<br/>(Mirzapur) Also called Rámpur s.; on left bank, 0.5 of a mile S.W. of village of the same name, 1.1 miles E. of Golauri, and 0.7 of a mile N.W. of Mahámanpura village. A large pin marks the station.</p> <p>λ 25 15 35.75<br/>L 82 28 12.51<br/>No. 228</p>    |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                    | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                         | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Ganges River No. 42 s.<br/>(Mirzapur) On S. bank, 1 mile S.E. of Japan bungalow, 1.1 miles S. of Thanipura, and 1.3 miles W. of Tili village. A platform 6 feet high denotes the station.</p> <p>λ 25 13 14.68<br/>L 82 27 40.75<br/>No. 229</p>                                                                                                                                            | <p>Ganges River No. 49 s.<br/>(Mirzapur) Also called Mirzapur s.; on a high house in the city. An iron pin marks the station.</p> <p>λ 25 9 3.04<br/>L 82 36 26.06<br/>Nos. 238, 239</p>            | <p>Gogra River No. 118 s.<br/>(Fyzabad) Also called Phulpur Village Ghat s.; on right bank, 0.1 of a mile W. of Bachupur, and at the same distance N.E. of Phulpur temple.</p> <p>λ 26 33 11.85<br/>L 82 47 1.15</p> |
| <p>Ganges River No. 43 s.<br/>(Mirzapur) Also called Derwa s.; on N. bank, 0.6 of a mile W. of Gangapura, 0.1 of a mile N.W. of Dubepura, and 0.2 of a mile S.E. of village of the same name. A platform 6 feet high marks the station.</p> <p>λ 25 13 54.88<br/>L 82 30 0.44<br/>No. 230</p>                                                                                                  | <p>Garaila Shiwála,<br/>(Allahabad) Spire, on right bank of the Ganges.</p> <p>λ 25 19 6.1<br/>L 82 5 22.7<br/>No. 246</p>                                                                          | <p>Gogra River No. 119 s.<br/>(Basti) On left bank, 1.5 miles S.E. of Dubia, 2.3 miles S. of Mieraulia, and 1.4 miles S.W. of Bhagautapur.</p> <p>λ 26 34 54.22<br/>L 82 43 42.91</p>                                |
| <p>Ganges River No. 44 s.<br/>(Mirzapur) On S. bank; a nadi flows 300 yards S. of the station.</p> <p>λ 25 11 35.98<br/>L 82 29 57.56<br/>No. 231</p>                                                                                                                                                                                                                                          | <p>Garbara Temple.<br/>(Mirzapur) Spire of white temple.</p> <p>λ 24 49 55.4<br/>L 82 16 23.2<br/>No. 133</p>                                                                                       | <p>Gogra River No. 120 s.<br/>(Fyzabad) On right bank, 0.3 of a mile N.W. of a temple, and 0.1 of a mile E. of Samrauna.</p> <p>λ 26 32 38.29<br/>L 82 44 44.72</p>                                                  |
| <p>Ganges River No. 45 h.s.<br/>(Mirzapur) Also called Moti Talao h.s.; about ½ of a mile S. of the Grand Trunk Road from Mirzapur to Allahabad, 3 miles W. of Kantit, and 1½ miles W. of Kuran village.</p> <p>λ 25 9 37.57<br/>L 82 30 31.89<br/>Nos. 48, 163, 232</p>                                                                                                                       | <p>Gaura Temple.<br/>(Allahabad) On left bank of the Tons river near junction with the Belan.</p> <p>λ 25 2 9.0<br/>L 81 47 51.6</p>                                                                | <p>Gogra River No. 121 s.<br/>(Fyzabad) Also called Tānda Masjid s.; on right bank, on a masjid in the town of Tānda.</p> <p>λ 26 33 20.37<br/>L 82 42 15.65</p>                                                     |
| <p>Ganges River No. 46 s.<br/>(Mirzapur) On N. bank, a branch of the river is 100 yards from the station, the high road from Gopiganj to Mirzapur passes 100 yards N. of it, 2.1 miles S. of Khāmāria shiwála, 0.7 of a mile S.W. of Pataira, and 0.5 of a mile N. of Misradhal village. A mound 6 feet high defines the station.</p> <p>λ 25 12 36.81<br/>L 82 33 28.92<br/>Nos. 233, 234</p> | <p>Gogra River No. 113* s.<br/>(Basti) On left bank, 0.9 of a mile S. of Parmesrapur, and 0.7 of a mile S.E. of Dhusua.</p> <p>λ 26 35 43.76<br/>L 82 51 11.73</p>                                  | <p>Gogra River No. 122 s.<br/>(Fyzabad) On right bank, 0.4 of a mile N. of Kakrahi, and 0.8 of a mile S.E. of Mahripur village ghat.</p> <p>λ 26 34 51.66<br/>L 82 40 16.25</p>                                      |
| <p>Ganges River No. 47 s.<br/>(Mirzapur) Also called Bindhāchal s.; in centre of roof of the highest house in the city belonging to a pandit; marked by an iron pin.</p> <p>λ 25 9 48.36<br/>L 82 32 55.66<br/>Nos. 57, 235</p>                                                                                                                                                                | <p>Gogra River No. 114 s.<br/>(Fyzabad) On right bank, 0.1 of a mile N. of Lachipur, and 0.2 of a mile S.E. of Mathia.</p> <p>λ 26 33 39.20<br/>L 82 50 49.20</p>                                   | <p>Gogra River No. 123 s.<br/>(Basti) On left bank, 0.9 of a mile S.E. of Tilwa, and 0.6 of a mile S.W. of Gainjot village.</p> <p>λ 26 36 20.23<br/>L 82 41 13.41</p>                                               |
| <p>Ganges River No. 48 s.<br/>(Mirzapur) On N. bank, 1.1 miles N. of Majgaon, 0.7 of a mile S.E. of Sripati, and 1.1 miles W. of Moia factory. A platform 6 feet high marks the station.</p> <p>λ 25 10 50.76<br/>L 82 34 59.63<br/>Nos. 236, 237</p>                                                                                                                                          | <p>Gogra River No. 115 s.<br/>(Basti) On left bank, 0.5 of a mile S.E. of Piparia, 0.6 of a mile S. of Chilwania, and 1.5 miles S.W. of Kudraha village.</p> <p>λ 26 35 19.28<br/>L 82 49 24.74</p> | <p>Gogra River No. 124 s.<br/>(Fyzabad) On right bank, 0.2 of a mile N.E. of Rajaur village temple, and 0.3 of a mile E. of Hadzgarh.</p> <p>λ 26 35 58.35<br/>L 82 38 40.17</p>                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                | <p>Gogra River No. 116 s.<br/>(Fyzabad) On right bank, 0.2 of a mile N.W. of Nasirabad.</p> <p>λ 26 33 37.45<br/>L 82 49 9.79</p>                                                                   | <p>Gogra River No. 125 s.<br/>(Basti) On left bank, 1.2 miles S.E. of Gobrahi, and 1 mile W. of Dongarpur Tola.</p> <p>λ 26 38 2.34<br/>L 82 39 15.52</p>                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                | <p>Gogra River No. 117 s.<br/>(Basti) On left bank and S. of Bhurawa.</p> <p>λ 26 34 57.18<br/>L 82 47 3.77</p>                                                                                     | <p>Gogra River No. 126 s.<br/>(Fyzabad) On right bank, 0.7 of a mile N.W. of Katargarh, and 0.5 of a mile S.E. of Isadgarj.</p> <p>λ 26 36 21.58<br/>L 82 36 23.71</p>                                               |

\* The preceding portion of this triangulation will be found in the Co-ordinate List of the Gora Meridional Series and the continuation in that of the Karara Meridional Series.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                      | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                            | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Gogra River No. 127 s.<br/>(Basti) On left bank, 0.1 of a mile N.W. of Golalpur, 0.3 of a mile E. of Bamanpura, and 0.1 of a mile S. of Lathara.</p> <p>λ 26 38 48.52<br/>L 82 35 58.63</p>                                   | <p>Gogra River No. 136 s.<br/>(Basti) On left bank, 0.2 of a mile S.E. of Gokula, 0.7 of a mile S.W. of Sujhaura, and 2.2 miles W. of Hamaipur.</p> <p>λ 26 43 24.82<br/>L 82 23 9.30</p>                                              | <p>Gogra River No. 144 s.<br/>(Gonda) On left bank, 1.3 miles N.E. of Mohana Ghat, 0.8 of a mile S.E. of Ibrahimpur, and 0.9 of a mile W. of Katara.</p> <p>λ 26 50 9.87<br/>L 82 14 11.72</p>                                         |
| <p>Gogra River No. 128 s.<br/>(Fyzabad) Also called Salona Ghat s.; on right bank, 0.1 of a mile N.W. of the village of Salona, and 0.2 of a mile S.E. of the Salona masjid in ruins.</p> <p>λ 26 37 27.11<br/>L 82 35 10.02</p> | <p>Gogra River No. 137 s.<br/>(Fyzabad) Also called Marana Village s.; on right bank, in the large village of Marana.</p> <p>λ 26 42 2.28<br/>L 82 20 30.87</p>                                                                        | <p>Gogra River No. 145 s.<br/>(Fyzabad) On right bank.</p> <p>λ 26 47 54.61<br/>L 82 12 31.01</p>                                                                                                                                      |
| <p>Gogra River No. 129 s.<br/>(Basti) On left bank, 2.5 miles S.E. of Amaniganj, and 2.2 miles S.W. of Gaura.</p> <p>λ 26 40 8.25<br/>L 82 33 30.38</p>                                                                          | <p>Gogra River No. 138 s.<br/>(Basti) On left bank, 0.4 of a mile N.W. of Duhua or Purachatán, 0.3 of a mile S.E. of Kajipur, and 0.5 of a mile S.W. of Bhartapur.</p> <p>λ 26 44 55.34<br/>L 82 20 11.17</p>                          | <p>Gogra River No. 146 s.<br/>(Gonda) On left bank, 0.6 of a mile S.E. of Jaitpur Tola, 1.4 miles S. of Bismampur, and 0.8 of a mile S.W. of Birapur.</p> <p>λ 26 50 12.13<br/>L 82 11 24.68</p>                                       |
| <p>Gogra River No. 130 s.<br/>(Fyzabad) On right bank, 0.6 of a mile S.E. of Karamgarh.</p> <p>λ 26 38 22.64<br/>L 82 31 55.94</p>                                                                                               | <p>Gogra River No. 139 s.<br/>(Fyzabad) On right bank, 0.4 of a mile S. of Rámpur, and 0.7 of a mile N. of Saráia.</p> <p>λ 26 43 49.77<br/>L 82 16 55.60</p>                                                                          | <p>Gogra River No. 147 s.<br/>(Gonda) On left bank, 0.6 of a mile E. of Kanaujapur, and 1.2 miles N.W. of Guptar ferry-ghat.</p> <p>λ 26 49 17.43<br/>L 82 8 43.65</p>                                                                 |
| <p>Gogra River No. 131 s.<br/>(Basti) On left bank, 0.2 of a mile E. of Subhika, 0.5 of a mile S.E. of Kataria, and 0.8 of a mile S. of Banjaria.</p> <p>λ 26 40 31.17<br/>L 82 31 15.33</p>                                     | <p>Gogra River No. 140 s.<br/>(Basti) On left bank, 0.2 of a mile S. of Misraulia, 0.4 of a mile S.W. of Kanakpur, and 0.4 of a mile N.W. of Chaura.</p> <p>λ 26 46 20.31<br/>L 82 18 31.87</p>                                        | <p>Gogra River No. 148 s.<br/>(Fyzabad) On right bank, 1 mile S.W. of Salarpur.</p> <p>λ 26 46 8.49<br/>L 82 8 37.72</p>                                                                                                               |
| <p>Gogra River No. 132 s.<br/>(Fyzabad) On right bank, 0.2 of a mile W. of Sujjanpur, and 1.2 miles E. of Muniar Bazar.</p> <p>λ 26 38 25.12<br/>L 82 29 48.75</p>                                                               | <p>Gogra River No. 141 s.<br/>(Fyzabad) On right bank, S.W. of Para and E. of Tihura.</p> <p>λ 26 45 30.51<br/>L 82 16 4.95</p>                                                                                                        | <p>Gogra River No. 149 s.<br/>(Gonda) Also called Punipurwa s.; on left bank, 1.5 miles S.E. of Dalikpurwa, at the same distance S. of Bairágpur, and 0.7 of a mile N.E. of Tul-sipur ferry.</p> <p>λ 26 48 16.32<br/>L 82 6 36.67</p> |
| <p>Gogra River No. 133 s.<br/>(Basti) On left bank, 0.4 of a mile N. of Asogpur, 1.2 miles S.E. of Laharbardihia, and 0.3 of a mile S. of Akumpur.</p> <p>λ 26 40 37.53<br/>L 82 28 52.50</p>                                    | <p>Gogra River No. 142 s.<br/>(Basti) Also called Belua Bazar s.; on left bank, 1.1 miles S.E. of Agaganj Bazar, 0.4 of a mile S.W. of Rámpur, and 0.5 of a mile N.W. of Hanu-mánpur Bazar.</p> <p>λ 26 48 34.88<br/>L 82 18 15.29</p> | <p>Gogra River No. 150 s.<br/>(Fyzabad) On right bank, 1.7 miles W. of Mantajpur, 0.4 of a mile N.E. of Saráia, and 0.6 of a mile E. of Rámsahai Upádhyaipurwa.</p> <p>λ 26 46 7.55<br/>L 82 5 42.21</p>                               |
| <p>Gogra River No. 134 s.<br/>(Fyzabad) On right bank.</p> <p>λ 26 38 49.21<br/>L 82 26 42.33</p>                                                                                                                                | <p>Gogra River No. 143 s.<br/>(Gonda) On left bank, 1.2 miles S.E. of Shahganj, and 0.5 of a mile S.W. Lamti.</p> <p>λ 26 49 40.83<br/>L 82 16 30.56</p>                                                                               | <p>Gogra River No. 151 s.<br/>(Gonda) On left bank, 2.8 miles E. of Baunda, 1.3 miles S.E. of Sakhipur, and 0.4 of a mile S.W. of Dharoram or Motipurwa.</p> <p>λ 26 48 34.66<br/>L 82 4 15.78</p>                                     |
| <p>Gogra River No. 135 s.<br/>(Basti) On left bank, 1.3 miles S.E. of Pahia, and 0.9 of a mile S.W. of Chapia.</p> <p>λ 26 41 36.74<br/>L 82 26 31.84</p>                                                                        | <p>Gogra River No. 143 s.<br/>(Gonda) On left bank, 1.2 miles S.E. of Shahganj, and 0.5 of a mile S.W. Lamti.</p> <p>λ 26 49 40.83<br/>L 82 16 30.56</p>                                                                               | <p>Gogra River No. 152 s.<br/>(Fyzabad) Also called Magarsi Village s.; on right bank, in the large village of Magarsi.</p> <p>λ 26 46 59.09<br/>L 82 3 4.32</p>                                                                       |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                         | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                         | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Gogra River No. 153 s.<br/>(Gonda) On left bank, 2·9 miles S.E. of Dhanauli, 0·7 of a mile S. of Marhain, and 2·4 miles N. of Dhamawa Ghat.</p> <p>λ 26 48 56·27<br/>L 82 1 22·78</p>                            | <p>Gogra River No. 162 s.<br/>(Bara Banki) On right bank, 0·5 of a mile N.W. of Shioparsād Tola, and 0·4 of a mile N. of Koilawar.</p> <p>λ 26 52 6·41<br/>L 81 50 9·30</p>                                         | <p>Haud s.<br/>(Jaunpur) Also called Haund; on W. bank of tank, about 1·4 miles N.W. of Jaunpur fort, and 1 mile S.E. of Tājpur village.</p> <p>λ 25 45 52·64<br/>L 82 43 3·61<br/>No. 278</p>                |
| <p>Gogra River No. 154 s.<br/>(Fyzabad) On right bank, 0·5 of a mile N. of Dimkapur, and 0·6 of a mile N.E. of Samau.</p> <p>λ 26 47 6·09<br/>L 81 58 51·89</p>                                                     | <p>Gogra River No. 163 s.<br/>(Gonda) On left bank, 0·4 of a mile S.W. of Thākuraīpurwa, and 1·4 miles N.E. of Dhama Ghat at the junction of the Sarju and Gogra rivers.</p> <p>λ 26 53 42·88<br/>L 81 49 43·42</p> | <p>Hetapati Temple,<br/>(Allahabad) Spire. Also called Saidaganj white temple.</p> <p>λ 25 29 31·0<br/>L 81 58 21·2</p>                                                                                       |
| <p>Gogra River No. 155 s.<br/>(Gonda) On left bank, 0·1 of a mile E. of Gopālpur, 1·3 miles S.E. of Paras, and 1·1 miles N.W. of Mangha.</p> <p>λ 26 49 10·36<br/>L 81 57 55·08</p>                                 | <p>Gogra River No. 164 s.<br/>(Bara Banki) On right bank, 1·2 miles N.W. of Dhema, and 0·4 of a mile N.E. of Nausara.</p> <p>λ 26 53 10·50<br/>L 81 48 19·18</p>                                                    | <p>Ibrāhimpur Idgāh,<br/>(Allahabad) Centre dome.</p> <p>λ 25 28 47·1<br/>L 81 58 7·3<br/>See Synoptical Vol. of the Kara Meridional Series.</p>                                                              |
| <p>Gogra River No. 156 s.<br/>(Fyzabad) Also called Sehor Ghat s.; on right bank, 0·8 of a mile N.W. of Kanaphorpur, and 0·5 of a mile E. of Sehor.</p> <p>λ 26 48 10·47<br/>L 81 56 24·16</p>                      | <p>Gogra River No. 165 s.<br/>(Gonda) On left bank, 0·6 of a mile N.W. of Sirsaipurwa, and 0·7 of a mile E. of the Sarju river.</p> <p>λ 26 54 59·14<br/>L 81 48 17·16</p>                                          | <p>Isāpur Temple,<br/>(Jaunpur) Spire.</p> <p>λ 25 45 48·1<br/>L 82 44 14·5<br/>No. 281</p>                                                                                                                   |
| <p>Gogra River No. 157 s.<br/>(Gonda) On left bank, 0·3 of a mile S. of Jagannāthpurwa, 0·5 of a mile W. of Sagam Tiwāripurwa, and 0·8 of a mile N. of Hathi Singhpurwa.</p> <p>λ 26 50 21·23<br/>L 81 55 48·86</p> | <p>Guptar Ghat Temple.<br/>(Fyzabad)</p> <p>λ 26 48 0·0<br/>L 82 9 37·2</p>                                                                                                                                         | <p>Jagdīshpur s.<br/>(Jaunpur) Near old well on high ground W. of village of the same name, and about 0·8 of a mile W. of the Busahatpur large village.</p> <p>λ 25 47 1·77<br/>L 82 39 14·89<br/>No. 268</p> |
| <p>Gogra River No. 158 s.<br/>(Bara Banki) On right bank, 2·2 miles N. of Hājīpur, and at the same distance W. of Raghupur.</p> <p>λ 26 49 21·92<br/>L 81 53 59·07</p>                                              | <p>Gurdari Hill Mark.<br/>(Baghelkhand, Rewah State) On a great peak 5 miles N.N.E. of Jiawan.</p> <p>λ 24 23 12·17<br/>L 82 21 32·45<br/>Nos. 64, 65</p>                                                           | <p>Jamaura, III.<br/>(Vide page 4—N.)</p> <p>λ 24 53 44·49<br/>L 82 29 31·07<br/>H 723<br/>h 8<br/>No. 3</p>                                                                                                  |
| <p>Gogra River No. 159 s.<br/>(Gonda) On left bank, 0·6 of a mile E. of Aman Singh's paka fort, 0·8 of a mile S.E. of Dhamawa-purwa, and 0·6 of a mile N. of Aili.</p> <p>λ 26 52 9·12<br/>L 81 53 43·21</p>        | <p>Gurūnagar, XXX.<br/>(Vide page 8—N.)</p> <p>λ 27 17 36·88<br/>L 82 11 11·50<br/>H 366<br/>h 24<br/>No. 30</p>                                                                                                    | <p>Jaunpur Church,<br/>(Jaunpur) N.W. spire.</p> <p>λ 25 43 48·5<br/>L 82 44 7·2<br/>No. 277</p>                                                                                                              |
| <p>Gogra River No. 160 s.<br/>(Bara Banki) On right bank, 0·2 of a mile N.E. of Kaithi village, and 0·7 of a mile S.E. of Kaithi ferry-ghat.</p> <p>λ 26 51 7·41<br/>L 81 51 30·32</p>                              | <p>Halīa Masjid,<br/>(Mirzapur) N. minaret.</p> <p>λ 24 49 34·9<br/>L 82 21 58·0</p>                                                                                                                                | <p>Jaunpur Fort s.<br/>(Jaunpur) On summit of high building on S.W. bastion of the fort occupied by the establishment of the Opium Agent.</p> <p>λ 25 44 53·83<br/>L 82 43 49·94<br/>No. 269</p>              |
| <p>Gogra River No. 161 s.<br/>(Gonda) On left bank, 0·3 of a mile S.W. of Paska-Tola.</p> <p>λ 26 53 2·01<br/>L 81 51 52·20</p>                                                                                     | <p>Hanumana Rock s.<br/>(Baghelkhand, Rewah State) W. side of high road to Mau, and N.W. of village of the same name.</p> <p>λ 24 46 55·88<br/>L 82 8 23·75<br/>Nos. 129, 130</p>                                   | <p>Jaunpur Jail,<br/>(Jaunpur) N.W. bastion of sandstone.</p> <p>λ 25 44 23·9<br/>L 82 43 56·7<br/>No. 276</p>                                                                                                |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Jaunpur Masjid Dome,<br/>(Jaunpur) Kalas.</p> <p>λ 25 45 31.2<br/>L 82 43 38.5<br/>No. 270</p> <p>Jaunpur Masjid Spire.<br/>(Jaunpur) N. spire of gateway.</p> <p>λ 25 45 31.5<br/>L 82 43 38.8<br/>Nos. 271, 272</p> <p>Jhūsi s.<br/>(Allahabad) On left bank of the Ganges, about 1½ miles E. of Allahabad fort.</p> <p>λ 25 25 35.75<br/>L 81 56 30.59<br/>See Synoptical Volume of the Karāra Meridional Series.</p> <p>Jhūsi Temple,<br/>(Allahabad) Near ghat.</p> <p>λ 25 26 18.8<br/>L 81 56 44.2<br/>See Synoptical Volume of the Karāra Meridional Series.</p> <p>Jiawan Hill Mark.<br/>(Baghelkhand, Rewah State)</p> <p>λ 24 21 51.78<br/>L 82 20 11.54<br/>No. 61</p> <p>Jigni h.s.<br/>(Baghelkhand, Rewah State) On the Drummond-ganj range, about 1 mile N.E. of Ghogām, and 2 miles E.N.E. of Raghunāthgarh village.</p> <p>λ 24 39 37.83<br/>L 82 10 11.00<br/>No. 122</p> <p>Kālāpatrī Hill Mark.<br/>(Mirzapur) On eastern edge of the Katra range; pargana Kantit.</p> <p>λ 24 44 54.54<br/>L 82 17 35.74<br/>Nos. 114, 115</p> <p>Kalsara s.<br/>(Allahabad) On S. bund of tank, 0.3 of a mile S. of the village so called, and 1 mile S.W. of Lariari.</p> <p>λ 24 59 24.48<br/>L 81 57 40.41</p> | <p>Kāmpur s.<br/>(Jaunpur) On N. bank of an old tank adjoining the village, about ½ of a mile N.W. of Loka Sarāi, ¼ of a mile E. of village of the same name, and at the same distance S. of Pattirāo.</p> <p>λ 25 45 46.47<br/>L 82 34 53.87<br/>No. 266</p> <p>Kapar h.s.<br/>(Baghelkhand, Rewah State) About 1 mile E.S.E. of Rundu, 1½ miles E.N.E. of Gorākhāri, and 1 mile S. of Pokra.</p> <p>λ 24 21 21.37<br/>L 82 7 25.90<br/>No. 82</p> <p>Kapradi, XIX.<br/>(Vide page 6—N.)</p> <p>λ 26 21 46.53<br/>L 82 18 38.02<br/>H 353.59*<br/>h 25.5<br/>No. 19</p> <p>Karaun Fort s.<br/>(Allahabad) On N.E. bastion of old fort, 1.8 miles N. of Patertal, 0.2 of a mile W. of Karaun thāna gate, and 2 miles S.E. of Simeria village.</p> <p>λ 24 59 35.32<br/>L 82 6 27.51<br/>Nos. 149, 150</p> <p>Karbara s.<br/>(Baghelkhand, Rewah State) On height S. of village and close to N. bank of the Son river.</p> <p>λ 24 30 28.30<br/>L 82 6 10.58<br/>Nos. 95, 96</p> <p>Kasda, II.<br/>(Vide page 4—N.)</p> <p>λ 24 34 17.87<br/>L 82 38 58.99<br/>H 1572<br/>h 9<br/>No. 2</p> <p>Kataia Hill Pagoda s.<br/>(Mirzapur) On hill, S. of the Grand Trunk Road from Mirzapur to Allahabad, and ½ a mile S.E. of Gaipura.</p> <p>λ 25 9 5.91<br/>L 82 26 21.05<br/>No. 185</p> | <p>Katra, IV.<br/>(Vide page 4—N.)</p> <p>λ 24 50 50.27<br/>L 82 12 9.34<br/>H 1350<br/>h 15<br/>No. 4</p> <p>Katra Dāk Bungalow s.<br/>(Mirzapur) On Sun-dial in the compound and 50 yards S.W. of the bungalow.</p> <p>λ 24 53 16.60<br/>L 82 13 5.08<br/>No. 145</p> <p>Katra Pass s.<br/>(Mirzapur) On head of the pass west of the road.</p> <p>λ 24 51 36.73<br/>L 82 11 17.27<br/>Nos. 142, 143</p> <p>Katra Patrol's Bungalow s.<br/>(Mirzapur) S.W. angle of the S.E. turret over staircase.</p> <p>λ 24 52 45.70<br/>L 82 12 22.93<br/>No. 144</p> <p>Kesra Hill Mark.<br/>(Baghelkhand, Rewah State) On the Kaimūr range.</p> <p>λ 24 30 19.04<br/>L 81 50 50.00<br/>Nos. 99, 100</p> <p>Ketulpur s.<br/>(Jaunpur) On mound in village, 0.4 of a mile W. of the large village of Saipur, and 0.7 of a mile S.E. of Jiripura.</p> <p>λ 25 46 10.14<br/>L 82 29 39.84<br/>No. 264</p> <p>Khairagarh Fort s.<br/>(Allahabad) On fort near old gateway, 0.7 of a mile N. of Barsaita village.</p> <p>λ 25 10 53.38<br/>L 82 6 18.94</p> <p>Khāmāria Shiwāla,<br/>(Mirzapur) Spire.</p> <p>λ 25 14 26.8<br/>L 82 33 6.3<br/>No. 253</p> |

\* This height refers to the upper mark-stone of the tower and was determined as follows. The point leveled to was on a paka brick imbedded in earth on E. side of the tower of which the height = 341.17 feet, and to this was added 12.42 feet (the height of the upper mark-stone above this brick).



| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                   | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                      | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Khámerji h.s.</b><br/>(<i>Baghelkhand, Rewah State</i>) On a remarkable commanding peak forming the southern boundary of the Kaimúr range above the Son river, about 1½ miles N.N.E. of village of the same name, 2½ miles E.S.E. of Malakpur, 2½ miles W.S.W. of Karwi Kar village, and 2½ miles N.W. of Koludi.</p> <p>λ 24 31 26.59<br/>L 81 57 33.28<br/>No. 80</p> | <p><b>Kumeria, XXV.</b><br/>(<i>Vide page 7—N.</i>)</p> <p>λ 26 51 41.75<br/>L 82 24 54.56<br/>H<sub>s</sub> 305.12*<br/>h 27<br/>No. 25</p>                                                                                                                                     | <p><b>Machir h.s.</b><br/>(<i>Baghelkhand, Rewah State</i>) On the Drummond-gunj range, close to and E. of village of the same name, and 1½ miles N.W. of Rámpur.</p> <p>λ 24 37 49.90<br/>L 81 58 15.95<br/>No. 106</p>  |
| <p><b>Kheri Bungalow.</b><br/>(<i>Allahabad</i>) Chimney of Patrol's bungalow.</p> <p>λ 25 2 1.8<br/>L 81 52 2.0</p>                                                                                                                                                                                                                                                          | <p><b>Kumeria Peak.</b><br/>(<i>Baghelkhand, Rewah State</i>) 1 mile S.W. of the village so called.</p> <p>λ 24 21 54<br/>L 82 15 30<br/>No. 67</p>                                                                                                                              | <p><b>Machlishahr s.</b><br/>(<i>Jaunpur</i>) On N.E. bastion of Tahsildári in centre of the city, close to and S.E. of Ghiswa town, and about 1 mile W. of Mirpur.</p> <p>λ 25 41 9.79<br/>L 82 27 15.81<br/>No. 263</p> |
| <p><b>Kodaili Hill Mark.</b><br/>(<i>Baghelkhand, Rewah State</i>) On a detached height belonging to the Drummondganj range.</p> <p>λ 24 42 36.31<br/>L 82 7 51.99<br/>Nos. 126, 127</p>                                                                                                                                                                                      | <p><b>Kusáhi Temple.</b><br/>(<i>Mirzapur</i>)</p> <p>λ 25 10 22.1<br/>L 82 54 55.7<br/>No. 51</p>                                                                                                                                                                               | <p><b>Mahmudabad Munshi's Temple.</b><br/>(<i>Allahabad</i>)</p> <p>λ 25 24 24<br/>L 81 57 2</p>                                                                                                                          |
| <p><b>Kohrár h.s.</b><br/>(<i>Allahabad</i>) On Bind range of hills S.W. of village of the same name.</p> <p>λ 25 8 19.37<br/>L 82 0 6.53<br/>Nos. 152, 153</p>                                                                                                                                                                                                               | <p><b>Kusalpurwa Mark.</b><br/>(<i>Allahabad</i>) On the tank bund of the village so called on the Bind hills, 6 miles W. of Tikor principal station, and 1½ miles N.E. of Unchadeh; thána Bháratganj, pargana Khairagarh.</p> <p>λ 25 2 53.58<br/>L 82 16 24.06<br/>No. 151</p> | <p><b>Majgaon Hill Mark.</b><br/>(<i>Allahabad</i>) On E. extremity of an isolated hill S.E. of Barokhar.</p> <p>λ 24 53 40.79<br/>L 82 1 33.67<br/>Nos. 138, 139</p>                                                     |
| <p><b>Kohrár Temple.</b><br/>(<i>Allahabad</i>) Spire of white temple in city.</p> <p>λ 25 9 2.6<br/>L 82 1 21.5<br/>Nos. 160, 161</p>                                                                                                                                                                                                                                        | <p><b>Kuti Ghát Temple.</b><br/>(<i>Allahabad</i>) On left bank of the Ganges river.</p> <p>λ 25 29 17.9<br/>L 81 57 25.1<br/>See Synoptical Volume of the Karára Meridional Series.</p>                                                                                         | <p><b>Mánapára, XXIX.</b><br/>(<i>Vide page 8—N.</i>)</p> <p>λ 27 13 18.67<br/>L 82 22 14.52<br/>H 347<br/>h 30<br/>No. 29</p>                                                                                            |
| <p><b>Kopa, XXVIII.</b><br/>(<i>Vide page 8—N.</i>)</p> <p>λ 27 7 3.74<br/>L 82 15 15.40<br/>H 365<br/>h 20<br/>No. 28</p>                                                                                                                                                                                                                                                    | <p><b>Lálganj h.s.</b><br/>(<i>Mirzapur</i>) About 2½ miles E. of village of the same name, and ¼ of a mile S. of the high road running S.W. from Mirzapur.</p> <p>λ 25 17.24<br/>L 82 26 30.22<br/>No. 169</p>                                                                  | <p><b>Mao Temple.</b><br/>(<i>Fyzabad</i>) S. of Fyzabad.</p> <p>λ 26 44 14.1<br/>L 82 9 26.6<br/>No. 282</p>                                                                                                             |
| <p><b>Korawa Rock.</b><br/>(<i>Baghelkhand, Rewah State</i>) Staff on precipitous rock S.E. of Bakshipahár.</p> <p>λ 24 55 52.5<br/>L 81 50 1.0</p>                                                                                                                                                                                                                           | <p><b>Lálganj Pagoda.</b><br/>(<i>Mirzapur</i>) Spike or Kalas of dome of white pagoda.</p> <p>λ 25 0 47.9<br/>L 82 23 51.2<br/>No. 173</p>                                                                                                                                      | <p><b>Mara Dome.</b><br/>(<i>Allahabad</i>) Also called Manda Dome; dome of white temple in Rája's house.</p> <p>λ 25 5 52.0<br/>L 82 18 21.8<br/>Nos. 176, 177</p>                                                       |
| <p><b>Kukra Shiwála,</b><br/>(<i>Allahabad</i>) Spire.</p> <p>λ 25 22 8.5<br/>L 82 1 25.6<br/>Nos. 244, 245</p>                                                                                                                                                                                                                                                               | <p><b>Lowana Tree.</b><br/>(<i>Allahabad</i>) In Centre of village.</p> <p>λ 25 21 48<br/>L 81 57 22<br/>No. 241</p>                                                                                                                                                             | <p><b>Mara East h.s.</b><br/>(<i>Allahabad</i>) Also called Manda h.s.; on a rock.</p> <p>λ 25 6 0.84<br/>L 82 20 5.80<br/>Nos. 174, 175</p>                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                  | <p><b>Mara Temple.</b><br/>(<i>Allahabad</i>) Also called Manda Temple; spire of sandstone temple.</p> <p>λ 25 5 58.4<br/>L 82 17 59.6<br/>Nos. 180, 181</p>                                                              |

\* This height refers to the mark-stone let into the ground floor of the tower.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Mara West h.s.<br/>(Allahabad) Also called Manda h.s.; mark 80 yards E. of the hill temple.</p> <p>λ 25 6 20.77<br/>L 82 18 54.11<br/>No. 182</p> <p>Maránadi s.<br/>(Fyzabad) On right bank of the Sarju river, about <math>\frac{1}{2}</math> of a mile N. of Bilári, and 1 mile N. of road from Tanda to Oudh.</p> <p>λ 26 41 34.60<br/>L 82 20 10.57<br/>Nos. 295, 296</p> <p>Marár, XI.<br/>(Vide page 5—N.)</p> <p>λ 25 41 17.20<br/>L 82 16 46.18<br/>H 371<br/>h 22<br/>No. 11</p> <p>Matura s.<br/>(Mirzapur) On lands 500 yards S.W. of the village, about 1 mile S.W. of Mánikpur, and <math>\frac{1}{2}</math> of a mile N.W. of Dulehpur.</p> <p>λ 25 1 32.10<br/>L 82 22 7.27<br/>No. 171</p> <p>Matwár s.<br/>(Mirzapur) On S. bund of tank, about <math>\frac{1}{2}</math> of a mile N.W. of village of that name, and <math>1\frac{1}{2}</math> miles S.W. of Majhgawan.</p> <p>λ 24 43 10.56<br/>L 82 29 58.05</p> <p>Mau Dák Bungalow,<br/>(Baghelkhand, Rewah State) Chimney.</p> <p>λ 24 39 52.5<br/>L 81 55 20.0</p> <p>Mau Rock s.<br/>(Baghelkhand, Rewah State) On flat rocks S.W. of the Dák bungalow.</p> <p>λ 24 39 41.4<br/>L 81 55 8.3<br/>Nos. 108, 109</p> <p>Mau Temple.<br/>(Baghelkhand, Rewah State) Spire of white temple in the fort.</p> <p>λ 24 39 10.5<br/>L 81 54 9.9<br/>No. 107</p> <p>Mauganj Temple.<br/>(Baghelkhand, Rewah State) Spire of white temple in the bazar.</p> <p>λ 24 40 4.0<br/>L 81 54 48.8</p> | <p>Meja, VI.<br/>(Vide page 4—N.)</p> <p>λ 25 7 10.16<br/>L 82 9 20.56<br/>H 498<br/>h 8<br/>No. 6</p> <p>Meja Fort.<br/>(Allahabad) Mark on S.E. side of the old fort.</p> <p>λ 25 8 36.0<br/>L 82 9 3.9<br/>No. 168</p> <p>Meja h.s.<br/>(Allahabad) About <math>\frac{1}{2}</math> of a mile S. of Meja village, and 1 mile W. of the Tahsildári.</p> <p>λ 25 7 52.32<br/>L 82 8 37.63<br/>No. 166</p> <p>Meja Tahsildári,<br/>(Allahabad) N.E. turret.</p> <p>λ 25 8 32.0<br/>L 82 8 40.3</p> <p>Meja Tahsildári,<br/>(Allahabad) S.E. turret.</p> <p>λ 25 8 31.1<br/>L 82 8 40.1<br/>No. 167</p> <p>Mirzapur Bungalow,<br/>(Mirzapur) Mr. Evans's.</p> <p>λ 25 9 39.7<br/>L 82 36 59.5<br/>Nos. 53, 54</p> <p>Mirzapur Cantonment,<br/>(Mirzapur) S.E. angle of terrace.</p> <p>λ 25 10 55.0<br/>L 82 38 15.9<br/>Nos. 55, 56</p> <p>Mirzapur Church,<br/>(Mirzapur) Steeple.</p> <p>λ 25 9 42.8<br/>L 82 38 10.3<br/>Nos. 186, 240</p> <p>Mirzapur Court House,<br/>(Mirzapur) New.</p> <p>λ 25 9 18.2<br/>L 82 37 24.1<br/>No. 52</p> | <p>Mirzapur Great Shiwála.<br/>(Mirzapur) On right bank of the Ganges to N.W. side of the city.</p> <p>λ 25 9 5.4<br/>L 82 36 53.8<br/>No. 259</p> <p>Mirzapur Large Shiwála.<br/>(Mirzapur) White Shiwála spire S. of the city.</p> <p>λ 25 8 51.4<br/>L 82 35 33.6<br/>No. 258</p> <p>Misrapur Shiwála,<br/>(Mirzapur) Spire.</p> <p>λ 25 15 53.7<br/>L 82 19 19.3<br/>No. 250</p> <p>Mohári h.s.<br/>(Mirzapur) About a mile S.E. of Mohári Khurd, <math>1\frac{1}{2}</math> miles N. of Mohári Kalán, and <math>2\frac{1}{2}</math> miles N.E. of Bijaipur.</p> <p>λ 25 7 52.08<br/>L 82 28 19.34<br/>Nos. 49, 50</p> <p>Moia N. Shiwála,<br/>(Mirzapur) Spire.</p> <p>λ 25 10 16.7<br/>L 82 34 48.0<br/>Nos. 254, 255</p> <p>Moia S. Shiwála,<br/>(Mirzapur) Spire.</p> <p>λ 25 10 5.4<br/>L 82 34 31.0<br/>No. 256</p> <p>Moia s.<br/>(Allahabad) Also called Allahabad No. 1 s.; 0.6 of a mile N.W. of village of the same name.</p> <p>λ 25 23 19.65<br/>L 81 56 29.36<br/>No. 258</p> <p>Morchía h.s.<br/>(Baghelkhand, Rewah State) Mark on hill 3 miles S.E. of Pokra village.</p> <p>λ 24 16 34.49<br/>L 82 34 9.12<br/>See Morchía of the Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.</p> <p>Moti Taláo Temple.<br/>(Mirzapur)</p> <p>λ 25 9 22.7<br/>L 82 30 16.7</p> |

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                              | Name of station, district, description,<br>co-ordinates &c.                                                                              | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Múgarikot s.<br/>(Mirzapur) On N.E. angle of an old fort W. of the village.</p> <p>λ 24 52 51.80<br/>L 82 13 5.92<br/>No. 135</p>                                                                                     | <p>Newa, XVI.<br/>(Vide page 6—N.)</p> <p>λ 26 5 35.33<br/>L 82 9 39.52<br/>H 355<br/>h 26<br/>No. 16</p>                                | <p>Oudh Temple No. 3.<br/>(Fyzabad)</p> <p>λ 26 48 33.6<br/>L 82 14 43.4</p>                                                                                                                                            |
| <p>Murchia, I.<br/>(Vide page 4—N.)</p> <p>λ 24 34 49.34<br/>L 82 23 26.80<br/>H 1640<br/>h 9<br/>No. 1</p>                                                                                                              | <p>Newáda, XIII.<br/>(Vide page 5—N.)</p> <p>λ 25 50 18.51<br/>L 82 17 42.99<br/>H 332<br/>h 24<br/>No. 13</p>                           | <p>Oudh Temple s.<br/>(Fyzabad) On right bank, of the Gogra river, on platform of temple at Rájghat in the city of Oudh.</p> <p>λ 26 48 32.84<br/>L 82 14 46.90</p>                                                     |
| <p>Murda Hill Temple,<br/>(Baghelkhand, Rewah State) N.E. of village.</p> <p>λ 24 28 45.8<br/>L 82 5 43.0<br/>No. 97</p>                                                                                                 | <p>Orejhar, XXIV.<br/>(Vide page 7—N.)</p> <p>λ 26 46 55.54<br/>L 82 14 34.78<br/>H 392.16*<br/>h 8<br/>No. 24</p>                       | <p>Pahári h.s.<br/>(Baghelkhand, Rewah State) On a detached hill S. of village of the same name, about ½ of a mile S.W. of Baihera, and 1½ miles E. of Dhumau.</p> <p>λ 24 31 36.71<br/>L 82 5 2.14<br/>Nos. 91, 92</p> |
| <p>Murli h.s.<br/>(Mirzapur) On a detached peak of the Kaimúr range, 4 miles S.W. of Halia.</p> <p>λ 24 47 26.81<br/>L 82 18 37.55<br/>Nos. 112, 113</p>                                                                 | <p>Oudh Masjid No. 1,<br/>(Fyzabad) N. Minaret.</p> <p>λ 26 48 25.5<br/>L 82 14 48.7</p>                                                 | <p>Paighambarpur Dargah,<br/>(Allahabad) Centre.</p> <p>λ 25 31 9.0<br/>L 81 58 11.8</p>                                                                                                                                |
| <p>Nagrai Rock s.<br/>(Baghelkhand, Rewah State) On southern face of the Drummondganj range, about 1½ miles W. of Dammodagarh, and 1½ miles S.E. of Rámpur village.</p> <p>λ 24 36 25.02<br/>L 82 0 22.76<br/>No. 98</p> | <p>Oudh Masjid No. 1,<br/>(Fyzabad) S. minaret.</p> <p>λ 26 48 24.9<br/>L 82 14 48.6</p>                                                 | <p>Pakera h.s.<br/>(Baghelkhand, Rewah State) On hill ½ of a mile N. of tank in village.</p> <p>λ 24 28 37.17<br/>L 82 14 11.83<br/>Nos. 78, 79</p>                                                                     |
| <p>Nansa, XXI.<br/>(Vide page 7—N.)</p> <p>λ 26 31 45.70<br/>L 82 19 52.27<br/>H 344<br/>h Not forthcoming<br/>No. 21</p>                                                                                                | <p>Oudh Masjid No. 2,<br/>(Fyzabad) N. minaret.</p> <p>λ 26 48 32.5<br/>L 82 14 48.7</p>                                                 | <p>Panasa Tree.<br/>(Allahabad) On old fort.</p> <p>λ 25 16 21<br/>L 82 5 26</p>                                                                                                                                        |
| <p>Naun Hill Mark.<br/>(Baghelkhand, Rewah State) On N. face of the Drummondganj range.</p> <p>λ 24 46 20.39<br/>L 82 13 17.23<br/>No. 123</p>                                                                           | <p>Oudh Masjid No. 2,<br/>(Fyzabad) S. minaret.</p> <p>λ 26 48 31.5<br/>L 82 14 48.6</p>                                                 | <p>Pándipura h.s.<br/>(Mirzapur) About 1½ miles N.E. of Dube Patti, and ½ of a mile S.W. of Parsia village.</p> <p>λ 25 6 43.63<br/>L 82 31 22.35<br/>Nos. 46, 165, 166</p>                                             |
| <p>Naun Temple,<br/>(Baghelkhand, Rewah State) Spire.</p> <p>λ 24 44 33.2<br/>L 82 11 40.1<br/>No. 128</p>                                                                                                               | <p>Oudh Temple No. 1.<br/>(Fyzabad) Spire of great temple called Rámádhán's temple.</p> <p>λ 26 47 45.7<br/>L 82 14 55.1<br/>No. 285</p> | <p>Panjerio Hill Mark.<br/>(Baghelkhand, Rewah State)</p> <p>λ 24 29 10.09<br/>L 82 44 18.73<br/>Nos. 37, 38</p>                                                                                                        |
| <p>Naun Temple,<br/>(Baghelkhand, Rewah State) Spire.</p> <p>λ 24 44 33.2<br/>L 82 11 40.1<br/>No. 128</p>                                                                                                               | <p>Oudh Temple No. 2.<br/>(Fyzabad) Spire of N. temple.</p> <p>λ 26 48 11.6<br/>L 82 15 1.9<br/>Nos. 293, 294</p>                        | <p>Parila Temple,<br/>(Allahabad) Spire.</p> <p>λ 25 32 47.2<br/>L 81 56 15.1</p>                                                                                                                                       |
|                                                                                                                                                                                                                          |                                                                                                                                          | <p>Parípura, XIV.<br/>(Vide page 6—N.)</p> <p>λ 25 54 33.57<br/>L 82 9 4.94<br/>H 332<br/>h 20<br/>No. 14</p>                                                                                                           |

\* This height refers to the mark-stone let into the upper surface of the pillar. This height as determined by Revenue Survey Spirit Levelling Operations is 392.23 feet.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                          | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                        | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Parsádi Temple.<br/>(Allahabad) Spire of temple on high road.</p> <p style="text-align: center;">o ' "</p> <p>λ 25 34 57·1<br/>L 82 10 10·3</p>                                                                                   | <p>Rájapur h.s.<br/>(Mirzapur) About 1½ miles N.E. of Dikhwah, and<br/>1½ miles S. of Umaria Sardar Gir.</p> <p style="text-align: center;">o ' "</p> <p>λ 24 56 35·92<br/>L 82 45 44·34<br/>Nos. 42, 43</p>                                       | <p>Sabkalai h.s.<br/>(Baghelkhand, Rewah State) On the Drummond-<br/>gunj range S.W. of Baisaur village.</p> <p style="text-align: center;">o ' "</p> <p>λ 24 48 18·27<br/>L 82 5 20·49<br/>No. 116</p>                                           |
| <p>Parsía s.<br/>(Mirzapur) On N.E. angle of tank bund, about ¾<br/>of a mile N.W. of Parsía Khurd, 1½ miles W. of<br/>Jhagaha village, and ¾ of a mile S. of Murpeli.</p> <p>λ 24 36 57·42<br/>L 82 24 34·24<br/>No. 105</p>        | <p>Rája Taláo Temple.<br/>(Mirzapur) Or Baggah Temple.</p> <p>λ 25 15 48·7<br/>L 82 53 21·5<br/>No. 59</p>                                                                                                                                         | <p>Saibara, XLIII.†<br/>(Vide page 8—N.)</p> <p>λ 27 26 58·94<br/>L 82 8 0·31<br/>H<sub>s</sub> 389·90§<br/>h 24<br/>No. 32</p>                                                                                                                   |
| <p>Pátpára h.s.<br/>(Baghelkhand, Rewah State) On range ¾ of a mile<br/>S.E. of village of the same name, 1½ miles N.E. of<br/>Kakraba, and ½ a mile W. of Salia village.</p> <p>λ 24 28 44·80<br/>L 81 56 12·54<br/>Nos. 93, 94</p> | <p>Rajauli Paka House s.<br/>(Fyzabad) On right bank of the Gogra river, on a<br/>paka house belonging to the late queen of Fyzabad<br/>near Guptar Ghat one of the remarkable places of<br/>pilgrimage.</p> <p>λ 26 48 11·27<br/>L 82 10 7·76</p> | <p>Saifabad, XV.<br/>(Vide page 6—N.)</p> <p>λ 26 1 5·10<br/>L 82 18 58·32<br/>H 340<br/>h 12<br/>No. 15</p>                                                                                                                                      |
| <p>Paua h.s.<br/>(Mirzapur) Also called Manjarah h.s.; ¼ of a mile<br/>N.E. of Newrhia Mánpurí, and ¾ of a mile S.W. of<br/>Hutwa Mánpurí.</p> <p>λ 25 5 35·34<br/>L 82 41 57·78<br/>Nos. 44, 45</p>                                 | <p>Rájgarh Temple.<br/>(Baghelkhand, Rewah State)</p> <p>λ 24 33 20·7<br/>L 82 12 15·6</p>                                                                                                                                                         | <p>Sanderipahár Hill Mark.<br/>(Baghelkhand, Rewah State) On the peak of the<br/>range running N.E. from Gurdari Hill Mark.</p> <p>λ 24 24 36·12<br/>L 82 27 20·22<br/>No. 69</p>                                                                 |
| <p>Phúlpur Temple.<br/>(Allahabad) Spire of temple in city.</p> <p>λ 25 32 57·2<br/>L 82 8 8·6</p>                                                                                                                                   | <p>Rámnapur, XII.<br/>(Vide page 5—N.)</p> <p>λ 25 44 55·09<br/>L 82 8 7·76<br/>H 356<br/>h 30<br/>No. 12</p>                                                                                                                                      | <p>Sansárpur Hill Mark.<br/>(Allahabad) On S. edge of the Kaimúr range.</p> <p>λ 24 52 26·98<br/>L 82 7 50·88<br/>No. 134</p>                                                                                                                     |
| <p>Pokra, XXXI.*<br/>(Vide page 4—N.)</p> <p>λ 24 18 47·97<br/>L 82 31 5·68<br/>H 2207<br/>h 3<br/>No. 1</p>                                                                                                                         | <p>Rámpur Shiwála.<br/>(Mirzapur) Spire of Shiwála on S. bank of the<br/>Ganges.</p> <p>λ 25 15 2·5<br/>L 82 9 26·2<br/>No. 162</p>                                                                                                                | <p>Sarái Masjid,<br/>(Allahabad) S.W. minaret.</p> <p>λ 25 29 24·4<br/>L 82 15 38·0<br/>No. 261</p>                                                                                                                                               |
| <p>Pokra s.<br/>(Baghelkhand, Rewah State) Mark at the village.</p> <p>λ 24 18 19·48<br/>L 82 31 38·26<br/>See Synoptical Volume of the Calcutta Longitudinal<br/>Series of the South-East Quadrilateral.</p>                        | <p>Rámpur Shiwála.<br/>(Mirzapur) Spire of Shiwála on S. bank of the<br/>Ganges.</p> <p>λ 25 15 2·5<br/>L 82 27 49·2<br/>No. 251</p>                                                                                                               | <p>Saráia s.<br/>(Jaunpur) On S.W. bank of an old tank, about 0·2<br/>of a mile S. of village of the same name, 1·7 miles<br/>N.E. of Kasni, and 0·9 of a mile N.W. of Marsil<br/>village.</p> <p>λ 25 41 57·47<br/>L 82 32 55·02<br/>No. 265</p> |
| <p>Ráhet, XXII.<br/>(Vide page 7—N.)</p> <p>λ 26 37 1·92<br/>L 82 10 53·86<br/>H<sub>s</sub> 343·80†<br/>h 25·5<br/>No. 22</p>                                                                                                       | <p>Rarauli, XX.<br/>(Vide page 6—N.)</p> <p>λ 26 26 54·27<br/>L 82 10 43·82<br/>H 357<br/>h 32<br/>No. 20</p>                                                                                                                                      | <p>Sarju River s.<br/>(Fyzabad) On right bank, about ¾ of a mile N. of<br/>Tekeah, and 1 mile E. of Ajudhya Deh.</p> <p>λ 26 44 38·54<br/>L 82 16 35·30<br/>Nos. 291, 292</p>                                                                     |
| <p>Ráhet, XXII.<br/>(Vide page 7—N.)</p> <p>λ 26 37 1·92<br/>L 82 10 53·86<br/>H<sub>s</sub> 343·80†<br/>h 25·5<br/>No. 22</p>                                                                                                       | <p>Sabanjot, XXVII.<br/>(Vide page 7—N.)</p> <p>λ 27 2 53·90<br/>L 82 25 39·64<br/>H 333<br/>h 32<br/>No. 27</p>                                                                                                                                   |                                                                                                                                                                                                                                                   |

\* Of the Calcutta Longitudinal Series of the S. E. Quadrilateral. † This height refers to the mark-stone let into the ground floor of the tower.  
 ‡ Of the North-East Longitudinal Series. § This height refers to the mark-stone let at 1½ inches below the upper surface of the pillar.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                    | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Sathar s.<br/>(Allahabad) On tree, about <math>\frac{1}{2}</math> of a mile N.W. of Mamrāj Sarāi masjid, and 1 mile S.W. of Sarāi masjid.</p> <p>λ 25 28 53.01<br/>L 82 14 59.33<br/>No. 260</p>                                                            | <p>Siwāra h.s.<br/>(Mirzapur) On the hill 3 miles E. of Lālganj.</p> <p>λ 25 0 0.57<br/>L 82 27 30.50<br/>No. 164</p>                                                                                                             | <p>Tendūa h.s.<br/>(Baghelkhand, Rewah State) About 2½ miles N.E. of Sirua, and the same distance S.W. of Nauriah village.</p> <p>λ 24 28 29.70<br/>L 82 30 39.85<br/>No. 88</p>                                                                                                                                      |
| <p>Seona, IX.<br/>(Vide page 5—N.)</p> <p>λ 25 27 33.51<br/>L 82 18 30.96<br/>H 333<br/>h 23<br/>No. 9</p>                                                                                                                                                     | <p>Sohāgi Hill Mark.<br/>(Baghelkhand, Rewah State) W. of high road, about 1 mile W. of the village.</p> <p>λ 24 58 22.90<br/>L 81 43 41.20</p>                                                                                   | <p>Tharwa Factory.<br/>(Allahabad) Also called Thorui factory; flag on top of Mr. Sander's house.</p> <p>λ 25 32 33<br/>L 81 57 32</p>                                                                                                                                                                                |
| <p>Shiopur House.<br/>(Mirzapur) Staircase of a high house.</p> <p>λ 25 9 56.7<br/>L 82 31 51.5<br/>No. 252</p>                                                                                                                                                | <p>Sugrimgari Tomb s.<br/>(Fyzabad) On tomb S. of Oudh, about <math>\frac{1}{2}</math> of a mile N.W. of Kasuna on the Grand Trunk Road from Oudh to Fyzabad.</p> <p>λ 26 47 35.22<br/>L 82 14 8.97<br/>No. 286</p>               | <p>Tikeria, XXVI.<br/>(Vide page 7—N.)</p> <p>λ 26 57 26.86<br/>L 82 16 27.96<br/>H 348<br/>h 26<br/>No. 26</p>                                                                                                                                                                                                       |
| <p>Shiopur Temple.<br/>(Mirzapur) Spire of Mahādeo's temple.</p> <p>λ 25 10 12.8<br/>L 82 32 1.1</p>                                                                                                                                                           | <p>Tānda Masjid No. 1,<br/>(Fyzabad) S. minaret.</p> <p>λ 26 33 12.4<br/>L 82 42 18.0</p>                                                                                                                                         | <p>Tikor, V.<br/>(Vide page 4—N.)</p> <p>λ 25 3 53.27<br/>L 82 21 58.17<br/>H 542<br/>h 16<br/>No. 5</p>                                                                                                                                                                                                              |
| <p>Sihāwal h.s.<br/>(Baghelkhand, Rewah State) On rocks W. of the village, about <math>\frac{1}{2}</math> of a mile S. of the road along N. bank of the Son river, and 1 mile S. of Ladbād village.</p> <p>λ 24 33 37.27<br/>L 82 16 28.31<br/>Nos. 86, 87</p> | <p>Tānda Masjid No. 1,<br/>(Fyzabad) N. minaret.</p> <p>λ 26 33 12.7<br/>L 82 42 18.0</p>                                                                                                                                         | <p>Tikor Hill Mark.<br/>(Mirzapur) On the highest part and to N.E. side of the hill.</p> <p>λ 25 5 35.26<br/>L 82 23 41.45<br/>Nos. 178, 179</p>                                                                                                                                                                      |
| <p>Sikandra Temple,<br/>(Allahabad) In city.</p> <p>λ 25 35 15.6<br/>L 82 1 6.1</p>                                                                                                                                                                            | <p>Tānda Masjid No. 2,<br/>(Fyzabad) S. minaret.</p> <p>λ 26 33 19.5<br/>L 82 42 14.6</p>                                                                                                                                         | <p>Tons and Belan Junction s.<br/>(Baghelkhand, Rewah State) At the junction, 0.2 of a mile S.W. of Gurkata village.</p> <p>λ 25 1 57.51<br/>L 81 47 56.14</p>                                                                                                                                                        |
| <p>Sirmaul s.<br/>(Allahabad) Also called Sirhaul s.; on S.E. bund of tank, 0.6 of a mile S. of village of the same name.</p> <p>λ 24 57 20.43<br/>L 82 15 48.77</p>                                                                                           | <p>Taripater Rock s.<br/>(Baghelkhand, Rewah State) On southern face of the Drummondganj range, about 1½ miles S.E. of Baroha, and 1½ miles N.E. of Sardawan village.</p> <p>λ 24 36 43.72<br/>L 82 5 55.66<br/>Nos. 101, 102</p> | <p>Tulsipur Pagoda,<br/>(Mirzapur) Dome, N. of the great road.</p> <p>λ 25 2 22.2<br/>L 82 27 24.4<br/>No. 170</p>                                                                                                                                                                                                    |
| <p>Sirwāra, XVIII.<br/>(Vide page 6—N.)</p> <p>λ 26 16 23.86<br/>L 82 9 57.19<br/>H 348<br/>h 28<br/>No. 18</p>                                                                                                                                                | <p>Tatpahār Hill Mark.<br/>(Baghelkhand, Rewah State) On Tatpahār range, N. of Parira village.</p> <p>λ 24 25 9.27<br/>L 82 9 16.61<br/>No. 70</p>                                                                                | <p>Urkutia Hill Mark.<br/>(Baghelkhand, Rewah State) On a great peak, 3 miles N.E. of Kumoria, and 3 miles N. of Jiawan.</p> <p>λ 24 22 11.89<br/>L 82 19 20.69<br/>Nos. 62, 63</p>                                                                                                                                   |
| <p>Siwar s.<br/>(Baghelkhand, Rewah State) Mark 20 yards S.W. from the stump of a pipal tree.</p> <p>λ 24 17 52.42<br/>L 82 20 54.30<br/>No. 66</p>                                                                                                            | <p>Tatpahār h.s.<br/>(Baghelkhand, Rewah State) On Tatpahār range, N.W. of Kochipur village.</p> <p>λ 24 24 17.25<br/>L 82 7 11.10<br/>No. 68</p>                                                                                 | <p>X s.<br/>(Jaunpur) In field, close to and W. of the Grand Trunk Road from Benares to Jaunpur, about <math>\frac{1}{2}</math> of a mile N. of Hosainabad, and <math>\frac{1}{2}</math> a mile N. of Jaunpur Cantonment Telegraph Post; thāna Haveli Jaunpur.</p> <p>λ 25 44 19.63<br/>L 82 43 43.21<br/>No. 275</p> |



## GURWANI MERIDIONAL SERIES.

SUPPLEMENTARY LIST OF  
CO-ORDINATES AND DESCRIPTIONS OF STATIONS AND POINTS.

Since the printing of the Alphabetical List of all stations and points it has been decided to include a further portion of the Ganges River Triangulation in this Volume, the stations of which appear below. In addition to the usual information the year when the point was fixed is also given.

| Name of station, district, description,<br>co-ordinates, &c.                                                                                                                                                                                                                                                                                                                                                                    | Name of station, district, description,<br>co-ordinates, &c.                                                                                                                                                                                                                                                                                                                                                | Name of station, district, description,<br>co-ordinates, &c.                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Balipurwa Village.</b><br>1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 11 36</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 36 36</div> <div></div> </div>                            | <b>Bedauli House,</b><br>In village. 1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 11 0</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 43 9</div> <div></div> </div>  | <b>Bhogaon Temple.</b><br>1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 13 36.3</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 36 23.8</div> <div></div> </div>            |
| <b>Baria Temple,</b><br>On ghát. 1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 9 10.9</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 36 54.0</div> <div></div> </div>                     | <b>Behari House,</b><br>In village. 1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 13 15</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 38 34</div> <div></div> </div> | <b>Bisundarpur House,</b><br>In village. 1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 10 29</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 38 28</div> <div></div> </div> |
| <b>Basahi House.</b><br>Two storied house in village. 1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 9 6.0</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 34 56.5</div> <div></div> </div> | <b>Bhatauli Hut,</b><br>On ghát. 1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 12 2</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 42 55</div> <div></div> </div>     | <b>Chapaur House,</b><br>In village. 1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 12 32</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 41 52</div> <div></div> </div>     |
| <b>Batauwa Bungalow.</b><br>Top of factory bungalow. 1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 8 36.1</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 51 15.7</div> <div></div> </div> | <b>Bhiti Temple.</b><br>1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 14 2.7</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 38 46.7</div> <div></div> </div>          | <b>Chila Shiwála,</b><br>Flag. 1848. ( <i>Mirzapur</i> ).<br><div style="text-align: right;">° ' "</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">λ</div> <div style="width: 40%;">25 9 32.4</div> <div style="width: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>82 36 4.1</div> <div></div> </div>         |

| Name of station, district, description,<br>co-ordinates, &c.                                                                                                                                        | Name of station, district, description,<br>co-ordinates, &c.                                                                                                                                      | Name of station, district, description,<br>co-ordinates, &c.                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Chunar Fort,<br/>Flagstaff. 1848. (<i>Mirzapur</i>).</p> <p style="text-align: center;">° ' "</p> <p>λ 25 7 30.0<br/>L 82 55 1.6</p> <p>See Synoptical Vol. of the Gora Meridional Series.</p>   | <p>Ganges River No. 56 s.<br/>On left bank. 1848. (<i>Mirzapur</i>).</p> <p style="text-align: center;">° ' "</p> <p>λ 25 9 48.18<br/>L 82 37 31.88</p>                                           | <p>Ganges River No. 66 s.<br/>On left bank, 1.5 miles S.E. of Sasepura village house, and 100 yards W.S.W. of Bhogaon village house. 1848. (<i>Mirzapur</i>).</p> <p style="text-align: center;">° ' "</p> <p>λ 25 13 36.48<br/>L 82 36 34.00</p> |
| <p>Chunar Fort,<br/>Sentry box in S.W. angle. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 11.2<br/>L 82 55 7.9</p>                                                                                       | <p>Ganges River No. 57 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 56.94<br/>L 82 38 13.50</p>                                                                                   | <p>Ganges River No. 67 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 51.70<br/>L 82 37 22.26</p>                                                                                                                                  |
| <p>Fulaha Temple.<br/>1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 31.0<br/>L 82 49 10.8</p>                                                                                                              | <p>Ganges River No. 58 s.<br/>On left bank and about 0.1 of a mile from it. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 30.54<br/>L 82 38 7.64</p>                                                    | <p>Ganges River No. 68 s.<br/>Also called Pachaura Village s., on left bank, 0.3 of a mile W.S.W. of Pachaura temple, and 100 feet E.S.E. of Pachaura village house. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 44.58<br/>L 82 37 27.10</p>          |
| <p>Gagraon Temple,<br/>In village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 14 2.7<br/>L 82 38 46.3</p>                                                                                                 | <p>Ganges River No. 59 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 32.53<br/>L 82 38 24.52</p>                                                                                  | <p>Ganges River No. 69 s.<br/>On right bank, 0.2 of a mile N.W. of Nauria village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 19.96<br/>L 82 37 47.11</p>                                                                                            |
| <p>Ganges River No. 50 s.<br/>On left bank, 0.5 of a mile W. of Moia building. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 59.68<br/>L 82 34 3.74</p>                                                    | <p>Ganges River No. 60 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 2.10<br/>L 82 38 6.33</p>                                                                                    | <p>Ganges River No. 70 s.<br/>On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 55.85<br/>L 82 38 20.61</p>                                                                                                                                   |
| <p>Ganges River No. 51 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 6.86<br/>L 82 35 1.43</p>                                                                                       | <p>Ganges River No. 61 s.<br/>On left bank, 0.3 of a mile E. of Bara Kolua, and 0.5 of a mile E.S.E. of Chhota Kolua village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 52.86<br/>L 82 37 51.14</p> | <p>Ganges River No. 71 s.<br/>On right bank, 0.1 of a mile N.N.E. of Behari village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 21.45<br/>L 82 38 37.50</p>                                                                                          |
| <p>Ganges River No. 52 s.<br/>On left bank, 0.2 of a mile S.S.W. of Purána Bara. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 30.91<br/>L 82 35 15.88</p>                                                 | <p>Ganges River No. 62 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 43.78<br/>L 82 37 23.88</p>                                                                                  | <p>Ganges River No. 72 s.<br/>On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 14 0.54<br/>L 82 39 12.89</p>                                                                                                                                    |
| <p>Ganges River No. 53 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 4.26<br/>L 82 36 20.55</p>                                                                                      | <p>Ganges River No. 63 s.<br/>Also called Saunkapura Village s., on left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 24.53<br/>L 82 36 52.86</p>                                                | <p>Ganges River No. 73 s.<br/>On right bank, 0.5 of a mile N.N.W. of Khutaba village, and 0.6 of a mile N.N.E. of Nauhan. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 14.58<br/>L 82 39 28.93</p>                                                     |
| <p>Ganges River No. 54 s.<br/>On left bank, 0.3 of a mile S.W. of Gargari house, and 0.1 of a mile S. of Shiodat Singh's temple. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 28.86<br/>L 82 36 47.29</p> | <p>Ganges River No. 64 s.<br/>Also called Taksari Village s., on left bank, 50 yards N. of Taksari village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 10.97<br/>L 82 36 2.15</p>                    | <p>Ganges River No. 74 s.<br/>On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 53.48<br/>L 82 41 2.42</p>                                                                                                                                    |
| <p>Ganges River No. 55 s.<br/>Also called Mirzapur Court House s. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 18.28<br/>L 82 37 23.79</p>                                                                | <p>Ganges River No. 65 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 19.72<br/>L 82 37 6.14</p>                                                                                   | <p>Ganges River No. 75 s.<br/>On right bank, 0.1 of a mile N.N.W. of Sinhora village, and 0.6 of a mile W.N.W. of Mahádeva village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 49.60<br/>L 82 40 30.11</p>                                           |



| Name of station, district, description,<br>co-ordinates, &c.                                                                                                                                                                                     | Name of station, district, description,<br>co-ordinates, &c.                                                                                                                                                   | Name of station, district, description,<br>co-ordinates, &c.                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Ganges River No. 76 s.<br/>On left bank, 0·2 of a mile W.N.W. of Khamária village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 13 34·44<br/>L 82 41 53·27</p>                                                                                        | <p>Ganges River No. 86 s.<br/>On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 22·81<br/>L 82 44 56·85</p>                                                                                                | <p>Ganges River No. 96 s.<br/>On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 8 1·69<br/>L 82 49 23·42</p>                                                                                                |
| <p>Ganges River No. 77 s.<br/>On right bank, 0·1 of a mile N.N.E. of Majgawa village, the same distance E.N.E. of Leru village, and 0·2 of a mile W.N.W. of Chapaur village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 40·36<br/>L 82 41 31·39</p> | <p>Ganges River No. 87 s.<br/>On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 54·13<br/>L 82 45 37·26</p>                                                                                                | <p>Ganges River No. 97 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 15·16<br/>L 82 49 48·08</p>                                                                                              |
| <p>Ganges River No. 78 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 35·31<br/>L 82 41 52·15</p>                                                                                                                                 | <p>Ganges River No. 88 s.<br/>On right bank, 0·5 of a mile E. of Chatáha village, and 0·3 of a mile N.N.E. of Dhamdeva village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 4·41<br/>L 82 45 8·01</p>              | <p>Ganges River No. 98 s.<br/>On left bank, 0·6 of a mile S.E. of Rámgarh village house, and 0·3 of a mile S.S.W. of Gahmai village house. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 27·03<br/>L 82 50 9·21</p> |
| <p>Ganges River No. 79 s.<br/>On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 59·67<br/>L 82 43 4·08</p>                                                                                                                                   | <p>Ganges River No. 89 s.<br/>On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 34·04<br/>L 82 46 35·57</p>                                                                                                | <p>Ganges River No. 99 s.<br/>On right bank, 0·1 of a mile N.N.E. of Suraiya village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 4·17<br/>L 82 50 26·82</p>                                                      |
| <p>Ganges River No. 80 s.<br/>On right bank, 0·1 of a mile E.N.E. of Bhatauli village, and the same distance N.W. of Bhatauli bázár. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 5·75<br/>L 82 42 49·18</p>                                          | <p>Ganges River No. 90 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 18·19<br/>L 82 45 52·04</p>                                                                                                | <p>Ganges River No. 100 s.<br/>On left bank, 0·5 of a mile S.W. of Goria village house, and 0·6 of a mile W.S.W. of Sfikhar building. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 21·25<br/>L 82 51 2·67</p>      |
| <p>Ganges River No. 81 s.<br/>Also called Jaunsara Village s., on right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 54·08<br/>L 82 43 7·15</p>                                                                                                 | <p>Ganges River No. 91 s.<br/>On right bank, 0·1 of a mile N.N.W. of Nánupura village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 8 28·20<br/>L 82 47 22·72</p>                                                      | <p>Ganges River No. 101 s.<br/>On right bank, 0·3 of a mile E. of Sindhaura village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 6 38·64<br/>L 82 51 33·32</p>                                                      |
| <p>Ganges River No. 82 s.<br/>On left bank, 0·3 of a mile S.W. of Baraini village house, and 0·4 of a mile W.S.W. of Baraini temple. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 12 25·93<br/>L 82 43 46·60</p>                                         | <p>Ganges River No. 92 s.<br/>On left bank, 0·5 of a mile S.S.W. of Bidyapur village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 24·22<br/>L 82 48 5·46</p>                                                       | <p>Ganges River No. 102 s.<br/>On left bank, 0·2 of a mile W.S.W. of Bithalpur village house. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 12·47<br/>L 82 51 43·88</p>                                             |
| <p>Ganges River No. 83 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 26·34<br/>L 82 43 41·57</p>                                                                                                                                 | <p>Ganges River No. 93 s.<br/>On left bank, 0·7 of a mile S.S.E. of Gosáinpur village, and 0·9 of a mile S. of Shiopura village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 9 26·02<br/>L 82 48 44·44</p>            | <p>Ganges River No. 103 s.<br/>On left bank, 0·2 of a mile W.S.W. of Silpi village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 1·64<br/>L 82 52 31·28</p>                                                        |
| <p>Ganges River No. 84 s.<br/>On left bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 11 51·91<br/>L 82 44 24·90</p>                                                                                                                                  | <p>Ganges River No. 94 s.<br/>On left bank, 0·5 of a mile N.N.W. of Paimápur village house, and 0·3 of a mile N. of Kantápur village house. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 8 38·12<br/>L 82 48 52·53</p> | <p>Ganges River No. 104 s.<br/>On right bank, 0·1 of a mile N.E. of Dhaurára village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 6 24·09<br/>L 82 52 43·44</p>                                                     |
| <p>Ganges River No. 85 s.<br/>On right bank, 0·3 of a mile E.S.E. of Gautampatti village, and 0·2 of a mile N. of Rattambo village. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 10 52·76<br/>L 82 44 19·63</p>                                          | <p>Ganges River No. 95 s.<br/>On right bank. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 59·13<br/>L 82 48 8·63</p>                                                                                                 | <p>Ganges River No. 105* s.<br/>On left bank, 0·8 of a mile S.W. of Madhi village building. 1848. (<i>Mirzapur</i>).</p> <p>λ 25 7 5·19<br/>L 82 53 2·47</p>                                                 |

\* The continuation of the Ganges River Triangulation to the east will be found in the Co-ordinate List of the Gora Meridional Series, where the stations are numbered afresh and not in continuation of those here given.

| Name of station, district, description,<br>co-ordinates, &c.                                                  | Name of station, district, description,<br>co-ordinates, &c.                                                                                                              | Name of station, district, description,<br>co-ordinates, &c.                                     |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Gosáinpura Mat.<br>1848. ( <i>Mirzapur</i> ).<br>o ' "<br>λ 25 12 28·7<br>L 82 35 49·3                        | Mirzapur House No. 2.<br>Parthráh Mahant's house. 1848. ( <i>Mirzapur</i> ).<br>o ' "<br>λ 25 8 41·6<br>L 82 35 49·8                                                      | Narghát Masjid,<br>E. minaret. 1848. ( <i>Mirzapur</i> ).<br>o ' "<br>λ 25 8 57·1<br>L 82 36 8·3 |
| Gosáinpura Temple.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 9 31·1<br>L 82 49 10·7                               | Mirzapur House No. 3.<br>Hamilton & Co's house chimney. 1848. ( <i>Mirzapur</i> ).<br>λ 25 9 7·9<br>L 82 36 45·7                                                          | Narghát Masjid,<br>W. minaret. 1848. ( <i>Mirzapur</i> ).<br>λ 25 8 57·1<br>L 82 36 7·7          |
| Itáwa Village.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 14 10<br>L 82 39 53                                      | Mirzapur House No. 4.<br>Mr. Money's house chimney. 1848. ( <i>Mirzapur</i> ).<br>λ 25 9 44·1<br>L 82 38 1·8                                                              | Pachaura Temple.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 13 47·9<br>L 82 37 41·3                   |
| Jaunsara Mat.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 11 46·0<br>L 82 43 10·7                                   | Mirzapur House No. 5.<br>Tiled house chimney. 1848. ( <i>Mirzapur</i> ).<br>λ 25 10 8·7<br>L 82 38 20·3                                                                   | Pipardar House,<br>In village. 1848. ( <i>Mirzapur</i> ).<br>λ 25 11 24<br>L 82 37 49            |
| Kachahwa Mound.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 12 6·9<br>L 82 45 14·8                                  | Mirzapur, Mission Church,<br>Turret. 1848. ( <i>Mirzapur</i> ).<br>λ 25 9 11·7<br>L 82 37 17·8                                                                            | Rámgarh Temple.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 7 56·0<br>L 82 49 36·4                     |
| Keotábir Village.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 13 25<br>L 82 42 27                                   | Mirzapur s.<br>Vide Ganges River No. 55 s.                                                                                                                                | Sabesar House,<br>In village. 1848. ( <i>Mirzapur</i> ).<br>λ 25 13 10<br>L 82 49 12             |
| Khamária Village.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 13 31<br>L 82 42 6                                    | Munjhara Dharmśála.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 12 28·8<br>L 82 35 49·1                                                                                         | Semra House,<br>In village. 1848. ( <i>Mirzapur</i> ).<br>λ 25 12 1<br>L 82 37 16                |
| Leru Temple.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 12 38·8<br>L 82 40 56·7                                    | Munjhara House,<br>In Bara Munjhara village. 1848. ( <i>Mirzapur</i> ).<br>λ 25 12 50<br>L 82 35 36                                                                       | Shamaspur Temple.<br>White temple. 1848. ( <i>Mirzapur</i> ).<br>λ 25 6 29·9<br>L 82 53 23·9     |
| Mirzapur, Garden Gate.<br>Lála Manbor's garden gate. 1848. ( <i>Mirzapur</i> ).<br>λ 25 8 52·0<br>L 82 35 2·2 | Murli h.s.<br>On a hill about 2 miles S. of the Ganges. 1848. ( <i>Mirzapur</i> ).<br>λ 25 5 21·45<br>L 82 51 22·55<br>See Synoptical Vol. of the Gora Meridional Series. | Sinhora Temple.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 12 38·8<br>L 82 40 56·6                    |
| Mirzapur Hotel,<br>Staircase. 1848. ( <i>Mirzapur</i> ).<br>λ 25 9 31·4<br>L 82 37 47·4                       | Nánupura House,<br>In village. 1848. ( <i>Mirzapur</i> ).<br>λ 25 8 24<br>L 82 47 26                                                                                      | Tree on long hill.<br>1848. ( <i>Mirzapur</i> ).<br>λ 25 5 39<br>L 82 41 54                      |

**GORA MERIDIONAL SERIES.**



## GORA MERIDIONAL SERIES—(LONG. $83^{\circ} 17'$ ).

### INTRODUCTION.

The completion of the Northern Section of the Great Arc Series in the year 1842, left sufficient hands available for taking up, besides those in progress, two more of the meridional series, which had been designed by the Surveyor General in 1831 and approved by the Hon'ble Court of Directors, to span the great plain of the River Ganges and its affluents, in Bengal and the North-West Provinces.

These series, or chains of triangles, were to be carried successively at intervals of one degree (about 60 miles) of longitude apart, from the Great Arc Series in the centre of the Peninsula, eastwards.

The first four chains, the Budhon (1), Rangír (2), Amua (3), and Karára (4), were now in progress or finished, and the 5th and 6th, the Gurwáni and Gora, Series being the next in order to the eastward of the Karára, were in contemplation. But the Governor General in Council here interposed, and directed that the two new parties formed from the *personnel* of the Great Arc Establishment, should be employed, not on the 5th and 6th (Gurwáni and Gora) Series, but upon the Gora (6th) and the Ohendwár (8th), *i.e.* on the alternate series, at two degrees apart from one another, the Gurwáni (5th) and Huriláong (7th) being omitted for the time.

The Gora Series, so named from the station of that name, to the meridian of which ( $83^{\circ} 17'$ ) it closely adheres, was based on the side Gora-Sewádhi of the Calcutta Longitudinal Series, whence it was carried for a distance of 210 miles to the northward, traversing the districts of Mirzapur (east side), Shahabad (west border), Benares, Ghazipur (west), Azamgarh, Gorakhpur (west side), and the eastern border of Basti, fixing the important towns of Chunar, Benares, Ghazipur, Azamgarh, and Gorakhpur.

It consists of twenty-nine stations, of which the six southernmost are on the Kaimúr range and other hills between the rivers Son (Soane) and Ganges, whilst the remaining twenty-three are tower stations of an average height of about 26 feet, in the plains.

The Series begins with two large single triangles stretching from the origin to the Kaimúr range, a distance of 41 miles, followed by six stations forming a compound figure round Basoha H.S., extending the Series a distance of 46 miles to the neighbourhood of Benares. The remainder of the Series consists of a chain of twenty-one single symmetrical triangles, having sides of about 12 miles in length.

During the recess season of 1843 the Surveyor General (Colonel G. Everest) directed

*Season 1843-44.*

PERSONNEL.

Mr. W. N. James, 1st Principal Sub-Assistant.  
 " H. Keelan, "  
 (joined late in the season).  
 " T. Olliver, "  
 " W. R. James, "

Mr. W. N. James to organize a triangulating party of the usual strength, with the assistants marginally noted, and furnished with Harris and Barrow's 15-inch theodolite\* which had been reconstructed in the departmental workshop. The party left the Head Quarters at Dehra Dún on the 1st of October 1843 and, after a long march of more than 500 miles, reached the scene of operations in January

1844, preceded by an advanced party which commenced the approximate series about the middle of December.

The progress of the work was much delayed owing to the haziness of the atmosphere, aggravated by the prevalence of forest fires in the neighbourhood of the operations. The approximate series however, was carried across the hill country a distance of 60 miles, and principal observations made at four stations, besides the determination of an astronomical azimuth, and a considerable quantity of secondary triangulation.

Mr. James went into recess quarters at Chunar on the 10th of May, but intended to resume the final observing as soon as the atmosphere should become clear. The party however suffered a good deal from sickness, five cases of cholera and two of sun-stroke proving fatal. Mr. James himself was taken ill in May, and died, unexpectedly, on the 14th June.

Lieutenant Peter Garforth of the Bengal Engineers, who had recently been appointed to the G. T. Survey Department and attached to the Chendwár Series, was forthwith ordered to take charge of the Gora Series, and reached Chunar on the 18th July 1844. His attention was first directed to a scrutiny of Mr. James's principal observations, and upon his report the Surveyor General directed them to be set aside, and the work to be recommenced from the origin. Accordingly Lieutenant Garforth took the field on the 1st October 1844 and proceeded to revise the work.

A good start seems to have been made at the outset, for on the 1st November he

*Season 1844-45.*

PERSONNEL.

Lieut. P. Garforth, Bengal Engineers, 2nd Asst.  
 Mr. H. Keelan, Sub-Assistant.  
 " T. Olliver, "  
 " W. R. James, "

reported considerable progress in the approximate series, but afterwards the party was much hindered by sickness, and in the following months, November and December, was so crippled that no further progress was made, and the best part of the season for observing passed away fruitlessly.

During January 1845 the work was resumed, but slowly, and the rest of the field season was spent in ray-tracing, line-clearing, and building the towers at the selected stations.

In June the Series had been laid out as far as Barhanpur (x)† on the north bank of the Ganges, a distance of about 100 miles from origin, and the party then went into recess quarters at Allahabad where Lieutenant Garforth had the benefit of the Surveyor General's personal instructions and counsel, whilst the recruiting and training the party went on at his head quarters.

\* For description of this instrument see page 72 of Appendices to Vol. II of the *Account of the Operations*, &c.

† The Roman number after the name of a station indicates its position in the series in numerical order.

The party took the field again early in October, reinforced by Mr. J. W. Armstrong who had already on several occasions had independent charge of a party, and reached the scene of the work before the end of the month. In accordance with his instructions Lieutenant Garforth employed the first part of the season in pushing on the approximate series in advance, so as to avoid entering the unhealthy tract of

Season 1845-46.

PERSONNEL.

Lieut. P. Garforth, B. E., 2nd Assistant.  
Mr. J. W. Armstrong, 2nd Principal Sub-Asst.  
" T. Olliver, "  
" C. A. Olliver, "

hilly country to the south, in which, by neglecting this precaution, his whole party had been disabled by sickness and all progress stayed, the previous year. About the middle of November, having selected the stations as far as Chit Bistrám (xiv), 130 miles from origin, he returned southwards selecting *en route* the stations of Khám (v) and Kandákot (ii) on the Bindháchal and Kaimúr hill ranges, by which Mr. James's original plan of the Series was much improved, and extended by the formation of the polygonal figure round Basoha (iii).

The final observation of the horizontal and vertical angles was begun on the 12th of December at Gora H.S., where a set of star observations for azimuth to  $\delta$  Ursæ Minoris, at both (E. and W.) elongations, was also taken in supersession of that observed by Mr. Olliver here in the course of the Calcutta Longitudinal Series, and the work was carried on and completed at the undermentioned stations, as follows:—

| at Gora        | H.S. (xxxv*) | between | December 12th | and | December 28th, | 1845            |
|----------------|--------------|---------|---------------|-----|----------------|-----------------|
| „ Sewádhi      | „ (xxxvii*)  | „       | January 3rd   | „   | January 8th,   | 1846            |
| „ Bagdharua    | „ (i)        | „       | „ 14th        | „   | „ 26th         | „               |
| „ Khám         | „ (v)        | „       | „ 29th        | „   | „ 30th         | „               |
| „ Kandákot     | „ (ii)       | „       | February 3rd  | „   | February 6th   | „               |
| „ Khorádi      | „ (iv)       | „       | „ 9th         | „   | „ 13th         | „               |
| „ Basoha       | „ (iii)      | „       | „ 18th        | „   | „ 25th         | „               |
| „ Garda        | „ (vi)       | „       | March 2nd     | „   | March 5th      | „               |
| „ Sikri        | T.S. (vii)   | „       | „ 9th         | „   | „ 21st         | „               |
| „ Hirdepur     | „ (ix)       | „       | „ 31st        | „   | April 23rd     | „               |
| „ Barháni      | „ (viii)     | „       | April 24th    | „   | June 4th,      | several visits. |
| „ Barhanpur    | „ (x)        | „       | June 7th      | „   | „ 10th         |                 |
| „ Gaura        | „ (xi)       | „       | „ 11th        | „   | „ 14th         |                 |
| „ Kanaun       | „ (xii)      | „       | „ 16th        | „   | July 5th       |                 |
| „ Kharakpur    | „ (xiii)     | „       | July 6th      | „   | „ 15th         |                 |
| „ Chit Bistrám | „ (xiv)      | „       | „ 16th        | „   | „ 24th         |                 |
| „ Samenda      | „ (xv)       | „       | „ 25th        | „   | August 8th     |                 |

Luminous signals were observed throughout; heliotropes by day, and argand lamps by night.

At Hirdepur,  $\alpha$  Ursæ Minoris was observed for azimuth at both elongations between March 30th and April 16th.

Latterly the work was very much retarded by thick hazy weather, especially at Barhá-

\* Of the Calcutta Longitudinal Series.

ni, where two of the rays were from 25 to 30 miles in length, too long to be ordinarily practicable, except in very clear weather.

The principal observations at the last eight stations had occupied over four months, only one being done in April, and none in May. Lieutenant Garforth however felt obliged to remain in the field and accomplish the task set before him, in order to make up for the want of progress during the previous season. He only reached head quarters, Allahabad, on the 25th of August.

The party suffered a good deal by continuing the field work in the rainy season, and Mr. Armstrong was obliged to quit the field about the end of June. But for its inordinate length, the season's work would have been an unusually good one, comprising final observations at 17 principal stations, extending the Series over 130 miles from south to north, and including two sets of circumpolar star observations for azimuth, with a good proportion of secondary triangulation, chiefly on the Ganges, between Chunar, Sultánpur, Benares, and Ghazipur.

The approximate series, including the tracing and clearing of rays, and the selection and building of stations, was carried about 60 miles through the plain country, in the Ghazipur and Azamgarh districts, as far north as the river Gogra, three triangles in advance of the closing point of the final observations.

The Surveyor General visited and inspected the party at Basoha H.S., near Benares, in the latter part of February, when he found it necessary to clean the axis of the large theodolite, on account of its excessive and increasing stiffness, by which the horizontal angles must ere long have been deteriorated, although no ill effects were noticed in the measurements already made.

The party took the field again, as marginally noted, on the 9th of October, and reached

*Season 1846-47.*

PERSONNEL.

Lieutenant P. Garforth, B.E., 2nd Assistant.  
Mr. J. W. Armstrong, 2nd Principal Sub-Assist.  
„ G. E. Terry, 1st Class Sub-Assistant.  
„ O. A. Olliver, 2nd Class „

the terminal point of the previous season's work on the 20th. Lieutenant Garforth at once took in hand the preliminary selection of stations in advance, whilst his assistants followed him, completing the requisite ray-clearing and tower-building, and by the beginning of December he

had reached the northern limit of the Series, after which he returned southwards to Samenda (xv), where he observed a set of circumpolar star observations to  $\delta$  Ursæ Minoris at both (E. and W.) elongations, at the periodic time for that star, between the 19th and 28th of December. This done, he hurried back to the north end of the Series, where he designed a polygonal figure round Púrena T.S. (Lv of the North-East Longitudinal Series), which however he was not called upon to complete.

By the middle of February the approximate series was so far advanced as to be ready for the final measurements to be taken up where they had been left off the previous season.

Lieutenant Garforth therefore again repaired to the spot, and resumed the final observations which he completed at the undermentioned stations, as follows:—

|               |           |                                               |
|---------------|-----------|-----------------------------------------------|
| at Samenda    | T.S. (xv) | between February 15th and February 18th, 1847 |
| „ Bhadir      | „ (xvi)   | „ „ 18th „ „ 21st „                           |
| „ Balariáganj | „ (xvii)  | „ „ 21st „ „ 24th „                           |



|                |              |                                           |
|----------------|--------------|-------------------------------------------|
| at Baniápár    | T.S. (xviii) | between February 24th and March 2nd, 1847 |
| „ Rájgarh      | „ (xx)       | „ March 5th „ „ 13th „                    |
| „ Barhiáchak   | „ (xix)      | „ „ 13th „ „ 14th „                       |
| „ Bhisia       | „ (xxi)      | „ „ 14th „ „ 18th „                       |
| „ Katwar       | „ (xxii)     | „ „ 18th „ „ 22nd „                       |
| „ Deokali      | „ (xxiii)    | „ „ 22nd „ „ 26th „                       |
| „ Saraia       | „ (xxiv)     | „ „ 26th „ „ 27th „                       |
| „ Muhammadpur  | „ (xxv)      | „ „ 30th „ April 2nd „                    |
| „ Rájabári     | „ (xxvi)     | „ April 2nd „ „ 18th „                    |
| „ Gharbaria    | „ (lviii)*   | „ „ 18th „ „ 20th „                       |
| „ Nandaur      | „ (xxvii)    | „ „ 20th „ „ 22nd „                       |
| „ Dharamsingua | „ (lvi)*     | „ „ 22nd „ „ 23rd „                       |

A final set of circumpolar star observations for azimuth was taken at Rájabári, between the 6th and 18th of April to  $\alpha$  Ursæ Minoris, at both (E. and W.) elongations.

The triangles that had been laid out to the north of Gharbaria-Dharamsingua were not observed this season, and as they appertain to the North-East Longitudinal Series, no account of them will be found in the published results of this Series. It may be remarked that Lieutenant Garforth's rate of progress in carrying on the final observations had increased greatly, for in the last seven weeks he completed eleven stations, including the eleven days spent in the azimuth observations at Rájabári. The out-turn of principal work for this season comprised: thirteen new stations selected, and the rays between them traversed, and cleared; twelve new towers built, over 25 feet in height (one of which Barhiáchak (xix) fell down twice, after completion to a height of 28 feet); fourteen triangles finally observed, extending the Series in a single chain 77 miles, in which two sets of star observations for azimuth were taken, besides a considerable amount of secondary triangulation which will be noticed separately below.

The entire period occupied by the Gora Series was four seasons, one of which, the first, may be said to have been lost, inasmuch as Mr. James's work had to be re-done, whence arose the necessity for re-visiting the unhealthy tract of country in which the party was disabled by sickness for a great part of the second season. On the whole, the entire Series, 210 miles in length, may be considered a very fair amount for three seasons, at the rate of about 70 miles per season, two of them being in a plain country.

On the completion of the Simultaneous Reduction of the North-East Quadrilateral, it was found that the undermentioned errors had been actually dispersed over the Gora Series between its origin, Gora-Sewádhi, of the Calcutta Longitudinal Series, and its terminus, Dharamsingua-Gharbaria, of the North-East Longitudinal Series:—

|                                                                              |   |        |
|------------------------------------------------------------------------------|---|--------|
| In Logarithm of the latter side—0.000, 0020, 1 or about 0.3 inches per mile. |   |        |
| „ Azimuth                                                                    | „ | +0.628 |
| „ Latitude of Gharbaria                                                      | „ | +0.044 |
| „ Longitude                                                                  | „ | +0.021 |

---

\* Of the North-East Longitudinal Series.

*Trigonometrical Heights.*

The trigonometrical determinations of the height of the stations of this Series above mean sea level, were derived in the first place from those of Gora-Sewádhi, as trigonometrically determined between Sironj and Calcutta by the Calcutta Longitudinal Series adjusted to the spirit-leveled values of its origin and terminus. The height of thirteen of the stations, however, was subsequently determined by connection with the lines of spirit-levels executed of late years by the Survey Department, and corrections have been applied to the trigonometrical values to make them correspond with the former.

The actual corrections applied to the trigonometrical heights of the twenty-nine stations of this Series, as brought up from origin to terminus, a distance of 210 miles, average 4·7 feet per station; the largest cumulative error disclosed being at Katwar (xxii) 8·3 feet. The largest error detected on any one side is 3·7 feet, which occurs on the side Barháni-Hirdepur (viii-ix). For further information regarding the details of the dispersion of this error see page 40 of Part I of Volume VII of the *Account of the Operations &c.*

*Secondary Triangulation.*

The secondary triangulation in connection with the Gora Series may be divided into six parts:—

1st. The hill triangles. Many conspicuous objects and points, chiefly in the hilly country at the south end of the Series, were fixed by the 15-inch theodolite, occasionally supplemented by observations with the 7-inch theodolite; amongst these were several points in and about Chunar and Benares, and the famous hill fort of Bijaigarh.

2nd. A minor series was carried along the Ganges by Mr. Armstrong with a 7-inch theodolite between Chunar and Benares, a direct distance of about 20 miles, starting from two points near the former, fixed by the triangulation above mentioned, and checked near its close, by another point determined in the same way. Several points in the old cantonment of Sul-tánpur were fixed by this work.

3rd. A ray-trace triangulation was carried by Mr. Armstrong in April 1846 with a 12-inch theodolite to fix Ghazipur and its environs, starting from Kanaun (xii), and closing on Barhanpur (x) of the Gora Series with the final values of which it is made to accord as usual.

4th. The position of two permanent points at Azamgarh was determined by some triangulation dependent on the ray-trace triangles between Samenda (xv) and Balariáganj (xvii). This work was done by Mr. Armstrong in 1846-47 with a 7-inch theodolite.

5th. The position of several points in Gorakhpur was fixed in the same manner by some minor triangulation dependent on, and in extension of, the ray-trace triangulation from Muhammadpur (xxv) to Saraia (xxiv).

## INTRODUCTION.

IX—0.

6th. In season 1852-53 a chain of secondary triangles was carried up the river Gogra, crossing the Gora Series from east to west between the stations of Baniápár (xviii), and Barhiáchak (xix), with which it is connected. The details of this minor series between stations Nos. 59 and 114 are published as a portion of the Gora Series; the eastern portion is fitted in between Khádípur T.S. of the Huriláong Series and Baniápár of this Series; the western portion, between Barhiáchak and Bisaul of the Gurwáni Series.

In parts 2nd, 3rd, 4th, 5th, and 6th, where the intermediate stations of observation were not permanently marked, no details of the triangles are now published.

In all, the position-values of 315 secondary points are published, but many of the stations or points of observation, could not probably be now found and identified. Temples, landmarks, forts, and other buildings of a permanent kind, were fixed to the number of 180.

B. R. BRANFILL.

*August 1881.*

---



## GORA MERIDIONAL SERIES.

## ALPHABETICAL LIST OF STATIONS.

|                                      |        |                                    |          |
|--------------------------------------|--------|------------------------------------|----------|
| Bagdharua . . . . .                  | I.     | Hirdepúr . . . . .                 | IX.      |
| Balaríáganj . . . . .                | XVII.  | Katwar . . . . .                   | XXII.    |
| Baniápár . . . . .                   | XVIII. | Kanáon . . . . .                   | XII.     |
| Barháni . . . . .                    | VIII.  | Kandákot . . . . .                 | II.      |
| Barhánpúr . . . . .                  | X.     | Khám . . . . .                     | V.       |
| Barhiáchak . . . . .                 | XIX.   | Kharakpúr . . . . .                | XIII.    |
| Basoha . . . . .                     | III.   | Khorádi . . . . .                  | IV.      |
| Bhádir . . . . .                     | XVI.   | Máhamadpúr . . . . .               | XXV.     |
| Bhisía . . . . .                     | XXI.   | Nandáor . . . . .                  | XXVII.   |
| Chit Bistrám . . . . .               | XIV.   | Rájábári . . . . .                 | XXVI.    |
| Deokali . . . . .                    | XXIII. | Rájgarh . . . . .                  | XX.      |
| Dharamsingua . . . . .               | LVI.   | Samenda . . . . .                  | XV.      |
| (of North-East Longitudinal Series). |        | Saraia . . . . .                   | XXIV.    |
| Gaora . . . . .                      | XI.    | Sewádhi . . . . .                  | XXXVIII. |
| Garda . . . . .                      | VI.    | (of Calcutta Longitudinal Series). |          |
| Gharbaria . . . . .                  | LVIII. | Sikri . . . . .                    | VII.     |
| (of North-East Longitudinal Series). |        |                                    |          |
| Gora . . . . .                       | XXXV.  |                                    |          |
| (of Calcutta Longitudinal Series).   |        |                                    |          |

## GORA MERIDIONAL SERIES.

## NUMERICAL LIST OF STATIONS.



|                   |                                                |                 |                                                       |
|-------------------|------------------------------------------------|-----------------|-------------------------------------------------------|
| XXXV . . . . .    | Gora.<br>(of Calcutta Longitudinal Series).    | XV . . . . .    | Samenda.                                              |
| XXXVIII . . . . . | Sewádhi.<br>(of Calcutta Longitudinal Series). | XVI . . . . .   | Bhádír.                                               |
| I . . . . .       | Bagdharua.                                     | XVII . . . . .  | Balaríáganj.                                          |
| II . . . . .      | Kandákot.                                      | XVIII . . . . . | Baníápár.                                             |
| III . . . . .     | Basoha.                                        | XIX . . . . .   | Barhíáchak.                                           |
| IV . . . . .      | Khorádi.                                       | XX . . . . .    | Rájgarh.                                              |
| V . . . . .       | Khám.                                          | XXI . . . . .   | Bhisía.                                               |
| VI . . . . .      | Garda.                                         | XXII . . . . .  | Katwar.                                               |
| VII . . . . .     | Sikri.                                         | XXIII . . . . . | Deokali.                                              |
| VIII . . . . .    | Barháni.                                       | XXIV . . . . .  | Saraia.                                               |
| IX . . . . .      | Hirdepúr.                                      | XXV . . . . .   | Máhamadpúr.                                           |
| X . . . . .       | Barhánpúr.                                     | XXVI . . . . .  | Rájábári.                                             |
| XI . . . . .      | Gaora.                                         | XXVII . . . . . | Nandáor.                                              |
| XII . . . . .     | Kanáon.                                        | LVI . . . . .   | Dharamsingua.<br>(of North-East Longitudinal Series). |
| XIII . . . . .    | Kharakpúr.                                     | LVIII . . . . . | Gharbaria.<br>(of North-East Longitudinal Series).    |
| XIV . . . . .     | Chit Bistrám.                                  |                 |                                                       |

## GORA MERIDIONAL SERIES.

## DESCRIPTION OF STATIONS.



XXXV. (*Of Calcutta Longitudinal Series*). Gora Hill Station, lat.  $24^{\circ} 5'$ , long.  $83^{\circ} 17'$ , has been named after the village of Gora which lies about 1 mile to the S.E., pargana Singraoli of the Mirzapore district. The hill is called Chandol by the villagers; another hill called Mirgárání, connected with it by a low ridge, is about 1 mile to E., and the detached hill of Margári is 2 miles to N.

The station was constructed in 1827 for the original triangulation of the Calcutta Longitudinal Series, as a raised platform with two mark-stones, one at the level of the hill summit, the other on the surface of the platform. The upper mark was found in good preservation when the station was visited in 1844, on commencing the Gora Series; the platform was then raised 2 feet, and a new mark-stone inserted on the surface in the normal of the original mark-stone; the new mark-stone was found in good preservation when the station was re-visited in February, 1864, in the course of the revision of the Calcutta Longitudinal Series.

XXXVIII. (*Of Calcutta Longitudinal Series*). Sewádhi Hill Station, lat.  $23^{\circ} 58'$ , long.  $83^{\circ} 48'$ , has been named after the village Sewádhi, which is situated about 1 mile to the N.W.; district Pálámao. The respectable village of Ranka lies about 2 miles to the N.E.

The station was constructed in 1827 for the original triangulation of the Calcutta Longitudinal Series, and consists of a raised platform with two mark-stones, one on the level of the hill summit, the other on the surface of the platform. The upper mark was found in good preservation when the station was visited in 1844, on commencing the Gora Series, and again in February, 1864, in the course of the revision of the Calcutta Longitudinal Series.

I. Bagdharua Hill Station, lat.  $24^{\circ} 33'$ , long.  $83^{\circ} 32'$ , is situated in the Mirzapore district, and stands on a hill, locally called Chaoria, appertaining to the Kaimúr range. The station is on the left bank of the river Son. The circumjacent villages, with their distances and bearings, are,—Barela and Maholi, about  $1\frac{1}{4}$  miles to the N.E., and Parti, on the opposite bank of the river, about the same distance to the S.W.

The platform is solid, and about 16 feet in height, with an isolated central paka pillar containing the mark-stones.

II. Kandákot Hill Station, lat.  $24^{\circ} 38'$ , long.  $83^{\circ} 3'$ , is situated in the Barhar pargana

of the Mirzapore district, on the Kaimúr range, at a distance of about 4 miles S.E. of the village of Rájpur, and 6 miles S.E. of that of Sháganj. A fort, partially built, stands on the hill not far from the station.

The station consists of a central paka pillar containing the mark-stones, and isolated from the surrounding platform.

III. Basoha Hill Station, lat.  $24^{\circ} 53'$ , long.  $83^{\circ} 19'$ , is situated in pargana Magrar of the Mirzapore district, and stands on one of the many knolls appertaining to the Bindráchal range. The adjacent villages, with their distances and bearings, are,—Naogarh, about  $2\frac{1}{2}$  miles S.; Laoari, about 3 miles to the W.; and Amdáha, 4 miles to the S.W. by W.

The station consists of a central paka pillar containing the mark-stones, and isolated from the surrounding platform.

IV. Khorádi Hill Station, lat.  $24^{\circ} 54'$ , long.  $83^{\circ} 1'$ , is situated in the Bhagwant pargana of the Mirzapore district, and stands on a knoll rising from a nearly level plot of ground covered with jungle.

The station consists of a central paka pillar containing the mark-stones, and isolated from the surrounding platform.

V. Khám Hill Station, lat.  $24^{\circ} 47'$ , long.  $83^{\circ} 34'$ , is situated in the Chainpúr pargana of the Sháhábád district, and stands on a swell of ground locally called Sankra, rising out of the table-land to the north of the Kaimúr range. The adjacent villages, with their distances and bearings, are,—Bara Khám, about 1 mile to the S.W., and Bhanera, about  $1\frac{1}{2}$  miles to the S.E.

The station consists of a central paka pillar containing the mark-stones, and isolated from the surrounding platform.

VI. Garda Hill Station, lat.  $24^{\circ} 57'$ , long.  $83^{\circ} 35'$ , is situated in the Chainpúr pargana of the Sháhábád district, and stands on a steep and nearly inaccessible hill, which is separated by a deep ravine from the Bindráchal range of mountains. The run of the hill is W.S.W. and E.N.E., and is about  $2\frac{1}{2}$  miles in length. The ascent to the station is very steep, and is made from the village of Rámgarh, which lies at the foot of the hill to the E.N.E., at a distance of  $2\frac{1}{2}$  miles. The city of Chainpúr is about 7 miles to the N.E.

The station consists of a central paka pillar containing the mark-stones, and isolated from the surrounding platform.

VII. Sikri Tower Station, lat.  $25^{\circ} 12'$ , long.  $83^{\circ} 15'$ , is situated in the Majwar pargana of the Benares district, and stands on a small mound, at the northern skirt of the village after which it is named. The adjacent places, with their distances and bearings, are,—Babúri village, about  $1\frac{1}{2}$  miles S.W., and Chanoli thana, on the Grand Trunk road, about  $5\frac{1}{2}$  miles to the N.E.

The tower is solid and circular, diameter 18 feet at base, and  $15\frac{1}{2}$  at summit, height 27 feet. It has an isolated central paka pillar for the theodolite to rest on, with a mark-stone at top, another at bottom, and three others intermediate.

VIII. Barhání Tower Station, lat.  $25^{\circ} 18'$ , long.  $83^{\circ} 27'$ , is situated in the Narwan



pargana of the Benares district, and stands on a small mound at the edge of a tank near the road leading from Sadraza to Amra, which latter is distant nearly half a mile to the W. of the village of Barhání.

The tower is solid and circular, diameter 32 feet at base and 16 at summit, height 27 feet; an isolated central paka pillar contains the mark-stones.

IX. Hirdepúr Tower Station, lat.  $25^{\circ} 24'$ , long.  $83^{\circ} 17'$ , is situated in the Mohuári pargana of the Benares district, and stands on a mound about 400 yards S.S.W. of the village of that name, and half a mile south of the road from Benares *via* Balúa to Ghazeepore.

The tower is solid and circular, diameter 17 feet at base and 15 at summit, height about 32 feet; an isolated central paka pillar contains the mark-stones.

X. Barhánpúr Tower Station, lat.  $25^{\circ} 32'$ , long.  $83^{\circ} 26'$ , is situated in pargana Bhitri of the Ghazeepore district, and stands on the raised bank of a tank distant about 200 yards to the N.E. of the village from which it takes its name. The road from Benares to Ghazeepore passes about  $\frac{1}{2}$  of a mile to the N., and the village of Dharwa lies about  $1\frac{1}{2}$  miles to the N.E. by E. of the station.

The tower is solid and circular, diameter 25 feet at base and 14 feet at summit, height 22 feet; an isolated central paka pillar contains the mark-stones.

XI. Gaora Tower Station, lat.  $25^{\circ} 38'$ , long.  $83^{\circ} 17'$ , is situated in pargana Bhitri of the Ghazeepore district, and stands on a high mound surrounded by the scattered hamlet of Gaora.

The tower is solid and circular, diameter 25 feet at base and  $13\frac{1}{2}$  feet at summit, height about 20 feet; an isolated central paka pillar contains the mark-stones.

XII. Kanáon Tower Station, lat.  $25^{\circ} 43'$ , long.  $83^{\circ} 26'$ , is situated in the Ghazeepore district, and stands on a small mound, about 100 yards to the N.N.E. of the principal portion of the scattered village of Kanáon. The villages of Rámpúr and Perojpúr are distant about 7 miles to the S.E. by E., and Sikhári factory,  $2\frac{1}{4}$  miles to the E. by N.

The tower is solid and circular, diameter 21 feet at base and 15 at summit, height about 20 feet; an isolated central paka pillar contains the mark-stones.

XIII. Kharakpúr Tower Station, lat.  $25^{\circ} 50'$ , long.  $83^{\circ} 16'$ , is situated in pargana Belbahans of the Azimgarh district, and stands on a mound about 50 yards square, said to be the site of an old fort. The village of Kharakpúr lies scattered at a distance of 100 yards to the west, north, and north-east of the station.

The tower is solid and circular, diameter 25 feet at base and 15 at summit, height about 20 feet. It has an isolated central paka pillar for the theodolite to rest on, with a mark-stone at top, and another at bottom.

XIV. Chit Bistrám Tower Station, lat.  $25^{\circ} 54'$ , long.  $83^{\circ} 26'$ , is situated in the Mahamdábád pargana of the Azimgarh district, and stands on a mound at the edge of a small tank, surrounded by the scattered village of Chit Bistrám.

The tower is solid and circular, diameter 25 feet at base and 15 at summit, height about 23 feet; an isolated central paka pillar contains the mark-stones.

XV. Samenda Tower Station, lat.  $26^{\circ} 0'$ , long.  $83^{\circ} 16'$ , is situated in the Mahamdábád pargana of the Azimgarh district, and stands on the bank of a tank adjoining the S.W. side of the large village of Samenda. The town of Azimgarh is distant 4 miles to the N.W. by N.

The tower is solid and circular, diameter 21 feet at base and 16 at summit, height 25 feet; an isolated central paka pillar contains the mark-stones.

XVI. Bhádir Tower Station, lat.  $26^{\circ} 5'$ , long.  $83^{\circ} 26'$ , is situated in the Mahamdábád pargana of the Azimgarh district, and stands close to the south side of the village of that name.

The tower is solid and circular, diameter 21 feet at base and  $16\frac{1}{2}$  at summit, height about 33 feet; an isolated central paka pillar contains the mark-stones.

XVII. Balariáganj Tower Station, lat.  $26^{\circ} 12'$ , long.  $83^{\circ} 16'$ , is situated in pargana Sagri of the Azimgarh district, and stands on the east side of a tank 300 yards N.E. of the large village of Balariáganj.

The tower is solid and circular, diameter 21 feet at base and 16 at summit, height about 33 feet; an isolated central paka pillar contains the mark-stones.

XVIII. Baniápár Tower Station, lat.  $26^{\circ} 15'$ , long.  $83^{\circ} 25'$ , is situated in the Sagri pargana of the Azimgarh district, and stands on a slight elevation at the south side of the hamlet of Baniápár. The village of Badiha is distant half a mile to the W. The station is in the kadar land of the river Ghágra.

The tower is solid and circular, diameter 21 feet at base and 17 at summit, height 25 feet; an isolated central paka pillar contains the mark-stones.

XIX. Barhiáchak Tower Station, lat.  $26^{\circ} 21'$ , long.  $83^{\circ} 16'$ , is situated in pargana Dhuríápúr of the Goruckpore district, and stands on the south-west side of the small village of Barhiáchak. The station is in the kadar land of the river Ghágra.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 28 feet in height; an isolated central paka pillar contains the mark-stones.

XX. Rájgarh Tower Station, lat.  $26^{\circ} 25'$ , long.  $83^{\circ} 26'$ , is situated in the Dhuríápúr pargana of the Goruckpore district, and stands contiguous to the southern side of the village after which it is named.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 26 feet in height; an isolated central paka pillar contains the mark-stones.

XXI. Bhisía Tower Station, lat.  $26^{\circ} 29'$ , long.  $83^{\circ} 12'$ , is situated in pargana Bhowapúr of the Goruckpore district, and stands on a small mound within the village of that name, on the right bank of the Kuána stream.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 23 feet in height; an isolated central paka pillar contains the mark-stones.

XXII. Katwar Tower Station, lat.  $26^{\circ} 34'$ , long.  $83^{\circ} 20'$ , is situated in pargana Anaol

of the Goruckpore district, and stands on a slight elevation 200 yards S.E. of the small village of Katwar, and 300 yards N.N.W. of the Bitāha indigo factory.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 23 feet in height. It has an isolated central paka pillar for the theodolite to rest on, with a mark-stone at top, and another at bottom.

XXIII. Deokali Tower Station, lat.  $26^{\circ} 38'$ , long.  $83^{\circ} 8'$ , is situated in the Maholi pargana of the Goruckpore district, and stands on a small mound contiguous to the south side of the hamlet of that name. The village of Mulapūr is distant 1 mile to the N.E.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 23 feet in height. It has an isolated central paka pillar for the theodolite to rest on, with a mark-stone at top, and another at bottom.

XXIV. Saraia Tower Station, lat.  $26^{\circ} 44'$ , long.  $83^{\circ} 19'$ , is situated in pargana Bhowapūr of the Goruckpore district, and stands on the eastern bank of a tank 300 yards N.E. of the village of Saraia. The road from Goruckpore to Bakhra passes close to the station to the south. The town of Goruckpore lies about 4 miles towards the E. The circumjacent villages, with their distances and bearings, are,—Bargahān, about  $\frac{1}{2}$  a mile to the E.N.E.; Kalesar, about  $1\frac{1}{2}$  miles to the N.W. by W., and Máhamadpūr, about  $2\frac{1}{2}$  miles to the N.N.W.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 28 feet in height; an isolated central paka pillar contains the mark-stones.

XXV. Máhamadpūr Tower Station, lat.  $26^{\circ} 46'$ , long.  $83^{\circ} 9'$ , is situated in the Maghar pargana of the Goruckpore district, and stands about 150 yards to the north of the deserted village of that name on the left bank of the Ami stream. The large village of Maghar is distant  $2\frac{1}{2}$  miles to the E. by S.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 28 feet in height; an isolated central paka pillar contains the mark-stones.

XXVI. Rājābāri Tower Station, lat.  $26^{\circ} 54'$ , long.  $83^{\circ} 18'$ , is situated in pargana Haveli Goruckpore of the Goruckpore district, and stands on a mound 80 yards W. of the village of that name. The river Rāpti flows to the west of the station, at a distance of half a mile, and the village of Aiasoál is distant nearly 200 yards to the W. by N.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 28 feet in height; an isolated central paka pillar contains the mark-stones.

XXVII. Nandāor Tower Station, lat.  $26^{\circ} 57'$ , long.  $83^{\circ} 7'$ , is situated in pargana Maghar of the Basti district, and stands about 200 yards to the S.E. of the village of Nandāor. The road from Goruckpore to Báñsi passes close to the station, and the town of Bakhra is distant  $1\frac{1}{2}$  miles to the S.E.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 26 feet in height. It has an isolated central paka pillar for the theodolite to rest on, with a mark-stone at top, and another at bottom.

LVI. (*Of the North-East Longitudinal Series*). Dharamsingua Tower Station, lat.  $27^{\circ} 5'$ ,

long.  $83^{\circ} 7'$ , is situated in pargana Báñsi of the Goruckpore district, and stands on the bund of a tank 200 yards E.S.E. of Dharamsingua village, and 300 yards S.W. of that of Gaori-Rái.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 25 feet high; an isolated central paka pillar contains the mark-stones. It was found in good preservation when the station was visited in 1849, in the course of the North-East Longitudinal Series.

LVIII. (*Of the North-East Longitudinal Series*). Gharbaria Tower Station, lat.  $27^{\circ} 3'$ , long.  $83^{\circ} 18'$ , is situated in pargana Haveli Goruckpore of the Goruckpore district, and stands 50 yards within the western verge of the forest. The Gúñghi nadi flows at about 1·8 miles to the W. The village of Gharbaria, near the road from Karmeni Ghat to Máhádeoa, is distant about 80 yards to the N.W.

The tower is solid, 20 feet square at base, 14 feet square at top, and about 25 feet high; an isolated central paka pillar contains the mark-stones. It was found in good preservation when the station was visited in 1849, in the course of the North-East Longitudinal Series.

---

## GORA MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the preceding descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives additional information as to position, construction, and present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

| No. of Station | Local name    | District   | Pargana, &c.                                     | Village in which the Station lies | Villages surrounding the Station | Remarks on the Construction and Condition of the Station                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------|---------------|------------|--------------------------------------------------|-----------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| XXXV           | Gohnda        | Mirzapur   | Tah. Robertsganj, P. Singrauli, Thá. Chaupan     | Gohnda                            | ...                              | In 1866 a square protecting pillar of masonry was built over the circular pillar on which the large theodolite stood and which carries the true mark-stone. The square pillar is $3\frac{1}{2}$ feet high, 28 inches square at base and 20 inches at top, and bears a sufficiently accurate mark for Topographical and Revenue Survey purposes, so that it is unnecessary to refer to the mark-stone which thus remains concealed and protected. A pyramidal pile of earth and stones, 7 feet square at base and 6 feet high, covers the protecting pillar. |
| XXXVIII        | ...           | Lohardugga | P. Palamow, Thá. Rámkunda                        | Sewádhi                           | ...                              | ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| I              | Barela Mahuli | Mirzapur   | Tah. Robertsganj, P. Bijai-garh, Thá. Pan-naganj | Barela Mahuli                     | ...                              | The pillar fallen down as reported in 1876.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| II             | Kandákot      | "          | Tah. and Thá. Robertsganj, P. Barhar             | Bahuara                           | ...                              | The top of the pillar broken as reported in 1875.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| III            | Simra         | "          | Tah. Chakia, P. Kera Mangraur, Thá. Ah-raura     | Simra                             | ...                              | ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| IV             | Khorádi       | Mirzapur   | Tah. and Thá. Chunar, P. Bhagwant                | Khorádi                           | ...                              | ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

NOTE.—Stations XXXV and XXXVIII appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral. tahsil, and Thá. for thána.

P. stands for pargana, Tah. for

| No. of Station | Local name     | District  | Pargana, &c.                                      | Village in which the Station lies | Villages surrounding the Station                                                             | Remarks on the Construction and Condition of the Station                                                                                               |
|----------------|----------------|-----------|---------------------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| V              | Khám           | Shahabad  | Thá. Bhúbooh, P. Chainpur                         | Khám                              | ...                                                                                          | ...                                                                                                                                                    |
| VI             | Garda or Ghari | "         | Thá. Mohania, P. Chainpur                         | Ghari                             | ...                                                                                          | ...                                                                                                                                                    |
| VII            | Sikri          | Benares   | Tah. Chandauli, P. Majwar                         | Sikri                             | ...                                                                                          | ...                                                                                                                                                    |
| VIII           | Barháni        | "         | Tah. Chandauli, P. Narwan                         | Barháni                           | ...                                                                                          | ...                                                                                                                                                    |
| IX             | Hirdepur       | "         | Tah. Chandauli, P. Mohuári                        | Hirdepur                          | ...                                                                                          | ...                                                                                                                                                    |
| X              | Barhanpur      | Ghazipur  | Tah. Sayyidpur, P. Bhitari, Thá. Nandganj         | Barhanpur Seh Patti               | ...                                                                                          | ...                                                                                                                                                    |
| XI             | Gaura          | "         | Tah. Sayyidpur Bhitari, P. Bahariabad, Thá. Sádát | Gaura                             | Sádát miles<br>N. E. by E. $4\frac{1}{2}$<br>Makdumpur<br>W. N. W. $1\frac{1}{2}$            | Upper portion of the tower, nearly 2 feet, broken as reported in 1867.                                                                                 |
| XII            | Kanaun         | "         | Tah. Ghazipur, P. and Thá. Shádiabad              | Kanaun                            | Koiri S. S. W. $3\frac{1}{2}$                                                                | No trace of the station found as reported in 1874.                                                                                                     |
| XIII           | Kharakpur      | Azamgarh  | Tah. Deogaon, P. Belhabáns, Thá. Chiriakot        | Kharakpur                         | Belha S. by W. 4<br>Maholi<br>S. W. by W. $5\frac{1}{2}$                                     | ...                                                                                                                                                    |
| XIV            | Chit Bistrám   | "         | Tah. and P. Muhammadabad                          | Chit Bistrám                      | Ránípur<br>N. E. by E. 2<br>Chiriakot<br>W. S. W. $4\frac{1}{2}$                             | ...                                                                                                                                                    |
| XV             | Samenda        | "         | Ditto.                                            | Samenda                           | Amaun E. 4<br>Mitupur S. by E. $3\frac{1}{2}$                                                | ...                                                                                                                                                    |
| XVI            | ...            | "         | ...                                               | ...                               | ...                                                                                          | There is no mark of mound or pillar at this spot over which the zamíndár has built a hut, as reported in 1867.                                         |
| XVII           | Balariaganj    | "         | Tah., P. and Thá. Sagri                           | Balariaganj                       | Akbarpur N. E. $1\frac{1}{2}$<br>Ramipur<br>S. S. W. 2<br>Bachaur<br>E. by N. $3\frac{1}{2}$ | "The upper part of each of these towers is knocked down to a certain extent, and the stonework in each case is not in existence", as reported in 1867. |
| XVIII          | Baniapár       | "         | Tah. and P. Sagri, Thá. Raunapár                  | Baniapár                          | Máhula E. S. E. 4<br>Bardeha W. $1\frac{1}{2}$<br>Muhammadpur<br>S. by E. $2\frac{3}{4}$     |                                                                                                                                                        |
| XIX            | ...            | Gorakhpur | Tah. Bánsaon, P. Dhuriapár, Thá. Kothibhár        | Barhiachak                        | Sháhpur N. $3\frac{1}{2}$<br>Ratanpur N. E. $3\frac{1}{4}$                                   | "Now only a kacha masonry mound 15 feet high exists", as reported in 1874.                                                                             |

NOTE.—P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

| No. of Station | Local name    | District  | Pargana, &c.                                        | Village in which the Station lies | Villages surrounding the Station                                               | Remarks on the Construction and Condition of the Station                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------|---------------|-----------|-----------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| XX             | ...           | Gorakhpur | Tah. Bánsaon, P. Dhuriapár, Thá. Kothibhár          | Rájgarh                           | Naribuzurg miles<br>N. E. 1½<br>Kohari S. by E. 1                              | Now only a mound 18 feet high exists as reported in 1874.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| XXI            | ...           | ...       | ...                                                 | ...                               | ...                                                                            | Entirely swept away by the Kuána stream as reported in 1870.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| XXII           | ...           | Gorakhpur | Tah. Bánsaon, P. Anaul, Thá. Kothibhár              | Katwar                            | Sháhpur Kabra<br>E. S. E. 3½<br>Bhadar W. by S. 4½<br>Babhnauli<br>S. S. E. 2½ | A paka pillar 19 feet high exists from which bricks have come out here and there as reported in 1874.                                                                                                                                                                                                                                                                                                                                                                                       |
| XXIII          | Deokali       | Basti     | Tah. Khalílabad, P. and Thá. Mahuli                 | Deokali                           | ...                                                                            | In a state of complete ruin as reported in 1879.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| XXIV           | ...           | Gorakhpur | Tah. Sadar, P. Bhowapur, Thá. Kotwáli               | Bargahán                          | ...                                                                            | No mark-stone is in existence. The station is about 9 feet in height, as reported in 1867.                                                                                                                                                                                                                                                                                                                                                                                                  |
| XXV            | ...           | "         | Tah. Sadar, P. Maghar, Thá. Saljanwa                | Muhammadpur                       | ...                                                                            | "No mark-stone is in existence. The station is about 24 feet in height", as reported in 1867.                                                                                                                                                                                                                                                                                                                                                                                               |
| XXVI           | ...           | "         | Tah. Sadar, P. Haveli, Thá. Ragauli                 | Rájabári                          | ...                                                                            | No mark-stone in existence, part of the station has been injured: it is about 6 feet high, as reported in 1867.                                                                                                                                                                                                                                                                                                                                                                             |
| XXVII          | Nandaur       | Basti     | Tah. Khalílabad, P. Hasanpur Maghar, Thá. Mihndáwal | Nandaur                           | ...                                                                            | ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LVI            | Dharam-singua | "         | Tah. and P. Bánsi, Thá. Májhra                      | Dharam-singua                     | Safti W. 1<br>Fatehpur N. W. 1½<br>Jamia E. by S. 2½                           | The station as built in 1847 consists of a solid tower, 20 feet square at base, 14 feet at top, and about 25 feet high, enclosing a central, isolated pillar of masonry which contains mark-stones. When again visited in 1849, in the course of the North-East Longitudinal Series operations, it was found in good preservation, and no alteration in its construction appears to have been made.                                                                                         |
| LVIII          | ...           | Gorakhpur | Tah. Maharáj-ganj, P. Haveli, Thá. Ragauli          | Gharbaria                         | Ragauli S. W. 2½                                                               | The station as built in 1847 consists of a solid tower, 20 feet square at base, 14 feet at top, and about 25 feet high, enclosing a central, isolated and perforated pillar of masonry which contains mark-stones. When again visited in 1849, in the course of the North-East Longitudinal Series operations, it was found in good preservation, and no alteration in its construction appears to have been made. Part of the tower injured, and no mark-stone found, as reported in 1867. |

NOTE.—Stations LVI and LVIII appertain to the North-East Longitudinal Series.

P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

August, 1882.

 J. B. N. HENNESSEY,  
In charge of Computing Office.





# GORA MERIDIONAL SERIES.

## PRINCIPAL TRIANGULATION. TRIANGLES.

NOTE.—The preceding pages, 1—0. to 8—0., having been printed in 1869, the spelling of Indian proper names occurring in them is in accordance with the Departmental or old rules; these prevailed until 1874, when the Government or new rules for spelling were published. The transition now (1879) necessary from the old to the new rules is effected hereafter as follows. Names not already printed are rendered by only one method of spelling, *i.e.*, the new. Any name that has appeared in the preceding pages is given by both methods, *viz.*, in Roman type by the new rules and in Italics by the old; to avoid needless repetitions, this is done *only* in the *first* instance that a name of the kind occurs. It will be seen that the two methods of spelling differ but slightly.

| No. of Triangle | Station          | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|------------------|------------------|-----------------------|-----------|----------|--------|
|                 |                  |                  |                       | Log. feet | Feet     | Miles  |
| 1               | Gora, XXXV       | 2'57             | 75 49 6'52            | 5'3530121 | 225430'2 | 42'695 |
|                 | Sewádhi, XXXVIII | 2'56             | 54 40 18'32           | 5'2780650 | 189699'0 | 35'928 |
|                 | Bagdharua, I     | 2'56             | 49 30 35'16           | 5'2475620 | 176832'5 | 33'491 |
| 2               | Gora, XXXV       | 2'39             | 48 13 57'32           | 5'2220843 | 166757'1 | 31'583 |
|                 | Bagdharua, I     | 2'40             | 73 43 19'36           | 5'3316618 | 214615'9 | 40'647 |
|                 | Kandákot, II     | 2'39             | 58 2 43'32            | 5'2780650 | 189699'0 | 35'928 |
| 3               | Bagdharua, I     | 1'39             | 48 22 31'19           | 5'1091679 | 128578'4 | 24'352 |
|                 | Kandákot, II     | 1'40             | 55 49 7'51            | 5'1531940 | 142296'4 | 26'950 |
|                 | Basoha, III      | 1'40             | 75 48 21'30           | 5'2220843 | 166757'1 | 31'583 |
| 4               | Bagdharua, I     | 57               | 35 36 45'40           | 4'9409101 | 87279'1  | 16'530 |
|                 | Basoha, III      | 58               | 36 4 33'36            | 4'9457716 | 88261'6  | 16'716 |
|                 | Khám, V          | 58               | 108 18 41'24          | 5'1531940 | 142296'4 | 26'950 |
| 5               | Basoha, III      | 38               | 38 12 20'78           | 4'7665010 | 58411'9  | 11'063 |
|                 | Khám, V          | 39               | 74 15 16'04           | 4'9585601 | 90899'2  | 17'216 |
|                 | Garda, VI        | 39               | 67 32 23'18           | 4'9409101 | 87279'1  | 16'530 |

NOTES.—1. The values of the side are given in the same line with the opposite angle.

2. Gora, XXXV, and Sewádhi, XXXVIII appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

| No. of Triangle | Station                                  | Spherical Excess | Corrected Plane Angle | Distance  |          |        |
|-----------------|------------------------------------------|------------------|-----------------------|-----------|----------|--------|
|                 |                                          |                  |                       | Log. feet | Feet     | Miles  |
| 6               | Basoha, III                              | 84               | 85 3 40'24            | 5'1523208 | 142010'6 | 26'896 |
|                 | Garda, VI                                | 84               | 55 19 2'96            | 5'0689759 | 117213'0 | 22'199 |
|                 | Sikri, VII                               | 83               | 39 37 16'80           | 4'9585601 | 90899'2  | 17'216 |
| 7               | Garda, VI                                | 78               | 31 34 47'74           | 4'8772941 | 75386'6  | 14'278 |
|                 | Sikri, VII                               | 78               | 67 50 37'97           | 5'1249077 | 133323'8 | 25'251 |
|                 | Barhāni, VIII                            | 78               | 80 34 34'29           | 5'1523208 | 142010'6 | 26'896 |
| 8               | Kandākot, II                             | 79               | 50 52 20'76           | 5'0065581 | 101521'5 | 19'228 |
|                 | Basoha, III                              | 78               | 49 51 56'81           | 5'0002386 | 100054'9 | 18'950 |
|                 | Khorādi, IV                              | 79               | 79 15 42'43           | 5'1091679 | 128578'4 | 24'352 |
| 9               | Basoha, III                              | 91               | 74 59 2'62            | 5'1261766 | 133713'9 | 25'325 |
|                 | Khorādi, IV                              | 90               | 57 51 2'08            | 5'0689759 | 117213'0 | 22'199 |
|                 | Sikri, VII                               | 90               | 47 9 55'30            | 5'0065581 | 101521'5 | 19'228 |
| 10              | Basoha, III                              | 95               | 57 50 48'51           | 5'1249077 | 133323'8 | 25'251 |
|                 | Garda, VI                                | 96               | 86 53 51'36           | 5'1965780 | 157245'4 | 29'781 |
|                 | Barhāni, VIII                            | 95               | 35 15 20'13           | 4'9585601 | 90899'2  | 17'216 |
| 11              | Sikri, VII                               | 37               | 56 6 54'51            | 4'8501795 | 70823'8  | 13'414 |
|                 | Barhāni, VIII                            | 37               | 61 48 0'08            | 4'8761434 | 75187'1  | 14'240 |
|                 | Hirdepur ( <i>Hirdepūr</i> ), IX         | 38               | 62 5 5'41             | 4'8772941 | 75386'6  | 14'278 |
| 12              | Barhāni, VIII                            | 39               | 52 38 5'56            | 4'8528341 | 71258'1  | 13'496 |
|                 | Hirdepur, IX                             | 39               | 75 11 6'52            | 4'9379023 | 86676'7  | 16'416 |
|                 | Barhanpur ( <i>Barhānpūr</i> ), X        | 38               | 52 10 47'92           | 4'8501795 | 70823'8  | 13'414 |
| 13              | Hirdepur, IX                             | 34               | 47 29 3'82            | 4'7973166 | 62707'1  | 11'876 |
|                 | Barhanpur, X                             | 35               | 75 37 38'64           | 4'9159843 | 82410'8  | 15'608 |
|                 | Gaura ( <i>Gaura</i> ), XI               | 34               | 56 53 17'54           | 4'8528341 | 71258'1  | 13'496 |
| 14              | Barhanpur, X                             | 26               | 54 35 45'81           | 4'7727365 | 59256'6  | 11'223 |
|                 | Gaura, XI                                | 27               | 65 47 59'12           | 4'8215832 | 66310'6  | 12'559 |
|                 | Kanaun ( <i>Kādon</i> ), XII             | 27               | 59 36 15'07           | 4'7973166 | 62707'1  | 11'876 |
| 15              | Gaura, XI                                | 30               | 62 22 33'62           | 4'8452193 | 70019'6  | 13'261 |
|                 | Kanaun, XII                              | 31               | 69 2 57'90            | 4'8680763 | 73803'4  | 13'978 |
|                 | Kharakpur ( <i>Kharakpūr</i> ), XIII     | 30               | 48 34 28'48           | 4'7727365 | 59256'6  | 11'223 |
| 16              | Kanaun, XII                              | 29               | 52 9 49'20            | 4'7790468 | 60123'9  | 11'387 |
|                 | Kharakpur, XIII                          | 29               | 60 56 46'98           | 4'8231421 | 66549'1  | 12'604 |
|                 | Chit Bisram, XIV                         | 29               | 66 53 23'82           | 4'8452193 | 70019'6  | 13'261 |
| 17              | Kharakpur, XIII                          | 28               | 68 6 55'07            | 4'8355919 | 68484'4  | 12'971 |
|                 | Chit Bisram, XIV                         | 27               | 57 19 53'76           | 4'7932873 | 62128'0  | 11'767 |
|                 | Samenda, XV                              | 27               | 54 33 11'17           | 4'7790468 | 60123'9  | 11'387 |
| 18              | Chit Bisram, XIV                         | 30               | 56 19 47'69           | 4'8101702 | 64590'7  | 12'233 |
|                 | Samenda, XV                              | 31               | 61 44 6'67            | 4'8347814 | 68356'8  | 12'946 |
|                 | Bhadir ( <i>Bhādīr</i> ), XVI            | 31               | 61 56 5'64            | 4'8355919 | 68484'4  | 12'971 |
| 19              | Samenda, XV                              | 31               | 60 32 10'80           | 4'8337564 | 68195'6  | 12'916 |
|                 | Bhadir, XVI                              | 31               | 63 54 40'67           | 4'8472356 | 70345'4  | 13'323 |
|                 | Balariāganj ( <i>Balariāganj</i> ), XVII | 31               | 55 33 8'53            | 4'8101702 | 64590'7  | 12'233 |
| 20              | Bhadir, XVI                              | 24               | 48 39 29'51           | 4'7260752 | 53220'0  | 10'080 |
|                 | Balariāganj, XVII                        | 24               | 57 10 41'51           | 4'7750267 | 59369'9  | 11'282 |
|                 | Baniāpār ( <i>Bāniāpār</i> ), XVIII      | 24               | 74 9 48'98            | 4'8337564 | 68195'6  | 12'916 |

PRINCIPAL TRIANGULATION. TRIANGLES.

11—o.

| No. of Triangle | Station                                | Spherical Excess | Corrected Plane Angle | Distance  |         |        |
|-----------------|----------------------------------------|------------------|-----------------------|-----------|---------|--------|
|                 |                                        |                  |                       | Log. feet | Feet    | Miles  |
| 21              | Balariáganj, XVII                      | "                | "                     |           |         |        |
|                 | Baniápár, XVIII                        | 22               | 71 56 50'29           | 4'8021156 | 63403'8 | 12'008 |
|                 | Barhiáchak ( <i>Barhiáchak</i> ), XIX  | 22               | 55 6 26'60            | 4'7379726 | 54698'2 | 10'359 |
| 22              | Baniápár, XVIII                        | 21               | 52 56 43'11           | 4'7260752 | 53220'0 | 10'080 |
|                 | Barhiáchak, XIX                        | 25               | 55 57 26'99           | 4'7673367 | 58524'4 | 11'084 |
|                 | Rájgarh, XX                            | 25               | 60 11 2'18            | 4'7873126 | 61279'1 | 11'606 |
| 23              | Barhiáchak, XIX                        | 26               | 63 51 30'83           | 4'8021156 | 63403'8 | 12'008 |
|                 | Rájgarh, XX                            | 24               | 85 23 48'06           | 4'8741104 | 74836'0 | 14'173 |
|                 | Bhisia ( <i>Bhisia</i> ), XXI          | 23               | 43 23 14'43           | 4'7124241 | 51573'2 | 9'768  |
| 24              | Rájgarh, XX                            | 24               | 51 12 57'51           | 4'7673367 | 58524'4 | 11'084 |
|                 | Bhisia, XXI                            | 24               | 44 38 26'21           | 4'7237514 | 52936'0 | 10'026 |
|                 | Katwar, XXII                           | 24               | 51 58 12'82           | 4'7733634 | 59342'2 | 11'239 |
| 25              | Bhisia, XXI                            | 25               | 83 23 20'97           | 4'8741104 | 74836'0 | 14'173 |
|                 | Katwar, XXII                           | 24               | 77 27 20'45           | 4'8440192 | 69826'3 | 13'225 |
|                 | Deokali, XXIII                         | 24               | 54 48 42'56           | 4'7668745 | 58462'1 | 11'072 |
| 26              | Katwar, XXII                           | 23               | 47 43 56'99           | 4'7237514 | 52936'0 | 10'026 |
|                 | Deokali, XXIII                         | 30               | 62 29 49'24           | 4'8389174 | 69010'9 | 13'070 |
|                 | Saraia, XXIV                           | 30               | 53 40 32'80           | 4'7971617 | 62684'7 | 11'872 |
| 27              | Deokali, XXIII                         | 31               | 63 49 37'96           | 4'8440192 | 69826'3 | 13'225 |
|                 | Saraia, XXIV                           | 22               | 51 28 19'58           | 4'7385104 | 54765'9 | 10'372 |
|                 | Muhammadpur ( <i>Máhamadpur</i> ), XXV | 22               | 48 11 58'08           | 4'7175644 | 52187'3 | 9'884  |
| 28              | Saraia, XXIV                           | 22               | 80 19 42'34           | 4'8389174 | 69010'9 | 13'070 |
|                 | Muhammadpur, XXV                       | 25               | 70 5 29'23            | 4'8201488 | 66092'0 | 12'517 |
|                 | Rájabári ( <i>Rájábári</i> ), XXVI     | 24               | 58 43 45'58           | 4'7787376 | 60081'1 | 11'379 |
| 29              | Muhammadpur, XXV                       | 24               | 51 10 45'19           | 4'7385104 | 54765'9 | 10'372 |
|                 | Rájabári, XXVI                         | 27               | 57 32 46'20           | 4'7935789 | 62169'7 | 11'775 |
|                 | Nandaur ( <i>Nandáor</i> ), XXVII      | 28               | 58 40 46'09           | 4'7989235 | 62939'5 | 11'920 |
| 30              | Rájabári, XXVI                         | 28               | 63 46 27'71           | 4'8201488 | 66092'0 | 12'517 |
|                 | Nandaur, XXVII                         | 25               | 72 18 26'32           | 4'8365002 | 68627'8 | 12'998 |
|                 | Gharbaria, LVIII                       | 25               | 48 1 55'66            | 4'7288365 | 53559'5 | 10'144 |
| 31              | Nandaur, XXVII                         | 25               | 59 39 38'02           | 4'7935789 | 62169'7 | 11'775 |
|                 | Gharbaria, LVIII                       | 23               | 59 18 50'34           | 4'7837907 | 60784'2 | 11'512 |
|                 | Dharamsingua, LVI                      | 23               | 44 31 49'93           | 4'6952012 | 49568'0 | 9'388  |
|                 |                                        | 23               | 76 9 19'73            | 4'8365002 | 68627'8 | 12'998 |

NOTE.—Dharamsingua, LVI, and Gharbaria, LVIII appertain to the North-East Longitudinal Series.

February 1879.

J. B. N. HENNESSEY,  
In charge of Computing Office.

# **GORA MERIDIONAL SERIES.** **SECONDARY TRIANGULATION. TRIANGLES.**

## PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

| No. of Triangle | Station                                    | Corrected Plane Angle             | Distance                         |                            |                            | No. of Triangle | Station                                                  | Corrected Plane Angle            | Distance                         |                          |                            | No. of Triangle | Theodolite used |
|-----------------|--------------------------------------------|-----------------------------------|----------------------------------|----------------------------|----------------------------|-----------------|----------------------------------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|-----------------|-----------------|
|                 |                                            |                                   | Log. feet                        | Feet                       | Miles                      |                 |                                                          |                                  | Log. feet                        | Feet                     | Miles                      |                 |                 |
| 32              | Gora, XXXV<br>Sewádhí, XXXVIII<br>Pipardar | 107 4 48<br>35 8 49<br>37 46 23   | 5.440841<br>5.220609<br>5.247562 | 275957<br>166191<br>176833 | 52.265<br>31.476<br>33.491 | 37              | Gora, XXXV<br>Khempur<br>Kandwa                          | 16 49 2<br>30 44 40<br>132 26 18 | 4.693195<br>4.940416<br>5.099876 | 49340<br>87180<br>125857 | 9.345<br>16.511<br>23.836  | 15<br>7<br>"    | Theodolite used |
| 33              | Gora, XXXV<br>Bagdharua, I<br>Pipardar     | 31 15 39<br>61 5 9<br>87 39 12    | 4.993542<br>5.220609<br>5.278065 | 98524<br>166191<br>189699  | 18.660<br>31.476<br>35.928 | 38              | Khempur<br>Kandwa<br>Bahráddol Hill Mark (Heliotrope)    | 55 40 56<br>78 8 25<br>40 13 46  | 4.751905<br>4.825595<br>4.693195 | 56481<br>66926<br>49340  | 10.697<br>12.675<br>9.345  | "<br>"<br>"     |                 |
| 34              | Bagdharua, I<br>Pipardar<br>Khempur        | 36 31 40<br>94 36 52              | 4.769624<br>4.871793<br>4.993542 | 58833<br>74438<br>98524    | 11.143<br>14.098<br>18.660 | 39              | Gora, XXXV<br>Kandwa<br>Bahráddol Hill Mark (Heliotrope) | 54 17 53                         | 4.751905<br>4.851364<br>4.940416 | 56481<br>71017<br>87180  | 10.697<br>13.450<br>16.511 | 15<br>7         |                 |
| 35              | Gora, XXXV<br>Bagdharua, I<br>Khempur      | 14 13 48<br>24 33 29<br>141 12 43 | 4.871793<br>5.099876<br>5.278065 | 74438<br>125857<br>189699  | 14.098<br>23.836<br>35.928 | 40              | Gora, XXXV<br>Khempur<br>Mirgaráni                       | 77 50 33<br>3 35 16              | 5.094901<br>3.901171<br>5.099876 | 124423<br>7065<br>125857 | 23.565<br>1.508<br>23.836  | 15<br>7         |                 |
| 36              | Bagdharua, I<br>Khempur<br>Kandwa          | 26 45 16<br>110 28 3<br>42 46 41  | 4.693195<br>5.011500<br>4.871793 | 49340<br>102683<br>74438   | 9.345<br>19.448<br>14.098  | 41              | Khempur<br>Kandwa<br>Mirgaráni                           | 27 9 24<br>137 13 7              | 4.922271<br>5.094901<br>4.693195 | 83612<br>124423<br>49340 | 15.836<br>23.565<br>9.345  | "<br>"<br>"     |                 |

NOTES.—1. Names followed by Roman numerals are those of Principal Stations.

Quadrilateral.

2. The values of the side are given in the same line with the opposite angle.

Stations Gora, XXXV, and Sewádhí, XXXVIII appertain to the Calcutta Longitudinal Series of the South-East

| No. of Triangle | Station                                                   | Corrected Plane Angle | Distance                                   |                            |                                    | No. of Triangle | Station                                                   | Corrected Plane Angle                   | Distance                                  |                           |                               | Theodolite used |
|-----------------|-----------------------------------------------------------|-----------------------|--------------------------------------------|----------------------------|------------------------------------|-----------------|-----------------------------------------------------------|-----------------------------------------|-------------------------------------------|---------------------------|-------------------------------|-----------------|
|                 |                                                           |                       | Log. feet                                  | Feet                       | Miles                              |                 |                                                           |                                         | Log. feet                                 | Feet                      | Miles                         |                 |
| 42              | Bagdharua, I<br>Pipardar<br>Magarda                       | h.s.<br>" "           | 4° 30' 139<br>4° 31' 026<br>4° 32' 542     | 20330<br>81400<br>98524    | 3° 8' 50<br>15° 41' 7<br>18° 66' 0 | 55              | Kandakot, II<br>Mangesar Hill Mark<br>Surharu Ghat (Pass) | 69° 8' 29<br>102° 25' 20                | 4° 62' 7913<br>3° 82' 3815<br>4° 64' 7063 | 42453<br>6665<br>44367    | 8° 04' 0<br>1° 262<br>8° 403  | Inch<br>15<br>7 |
| 43              | Pipardar<br>Magarda<br>Bijagarh                           | h.s.<br>" "           | 4° 35' 7327<br>4° 36' 15372<br>4° 38' 8139 | 22768<br>14301<br>20330    | 4° 31' 2<br>2° 709<br>3° 850       | 56              | Kandakot, II<br>Khoradi, IV<br>Dibar Hill Mark            | 80° 5' 32<br>23° 38' 9                  | 5° 00' 6300<br>4° 61' 5886<br>5° 00' 0239 | 101461<br>41294<br>100055 | 19° 216<br>7° 821<br>18° 950  | 15<br>" "       |
| 44              | Bagdharua, I<br>Pipardar<br>Bijagarh                      | h.s.<br>" "           | 4° 15' 5372<br>5° 01' 7693<br>4° 99' 3542  | 14301<br>104158<br>98524   | 2° 709<br>19° 727<br>18° 660       | 57              | Magarda<br>Bijagarh<br>Rangarh Building                   | 78° 34' 39<br>64° 54' 42                | 4° 57' 4140<br>4° 53' 9791<br>4° 55' 7327 | 37509<br>34657<br>22768   | 7° 104<br>6° 564<br>4° 312    | 7<br>" "        |
| 45              | Gora, XXXV<br>Mingarani<br>Murgari Hill Mark (heliotrope) | h.s.                  | 4° 19' 2693<br>4° 12' 0065<br>3° 90' 1171  | 15585<br>13185<br>7965     | 2° 952<br>2° 497<br>1° 508         | 58              | Bagdharua, I<br>Kham, V<br>Moraina                        | 9° 57' 39<br>140° 50' 9                 | 4° 49' 5415<br>5° 05' 7836<br>4° 94' 5772 | 31291<br>114245<br>88262  | 5° 926<br>21° 637<br>16° 716  | 12<br>15        |
| 46              | Khempur<br>Kandwa<br>Kona Building                        | h.s.<br>" "           | 4° 68' 7997<br>4° 01' 6830<br>4° 69' 3195  | 48753<br>10395<br>49340    | 9° 233<br>1° 969<br>9° 345         | 59              | Kandakot, II<br>Khoradi, IV<br>Surharua No. 1             | 80° 58' 40<br>52° 27' 6                 | 4° 06' 2122<br>5° 09' 5647<br>5° 00' 0239 | 91648<br>124637<br>100055 | 17° 358<br>23° 605<br>18° 950 | " 7             |
| 47              | Khempur<br>Kandwa<br>Kona Temple No. 1                    | h.s.<br>" "           | 4° 69' 9687<br>4° 04' 7184<br>4° 69' 3195  | 50083<br>11148<br>49340    | 9° 485<br>2° 111<br>9° 345         | 60              | Kandakot, II<br>Basoha, III<br>Surharua No. 1             | 65° 20' 22<br>110° 21' 30               | 4° 01' 2342<br>5° 09' 5647<br>5° 109' 168 | 10288<br>124637<br>128578 | 1° 949<br>23° 605<br>24° 352  | 15<br>7         |
| 48              | Khempur<br>Kandwa<br>Kona Temple No. 2                    | h.s.<br>" "           | 4° 71' 2089<br>4° 00' 1631<br>4° 69' 3195  | 51533<br>10038<br>49340    | 9° 760<br>1° 901<br>9° 345         | 61              | Kandakot, II<br>Surharua No. 1<br>Surharua No. 2          | 77° 55' 53<br>98° 53' 4                 | 3° 84' 5538<br>5° 09' 1182<br>5° 09' 5647 | 7007<br>123362<br>124637  | 1° 327<br>23° 364<br>23° 605  | " "             |
| 49              | Pipardar<br>Bijagarh<br>Gidwas Hill Mark                  | h.s.<br>" "           | 4° 41' 4816<br>4° 29' 1051<br>4° 15' 5372  | 25991<br>19546<br>14301    | 4° 922<br>3° 702<br>2° 709         | 62              | Basoha, III<br>Surharua No. 1<br>Surharua No. 2           | 40° 39' 54<br>32° 25' 37<br>106° 54' 29 | 3° 84' 5538<br>3° 76' 0880<br>4° 01' 2342 | 7007<br>5766<br>10288     | 1° 327<br>1° 092<br>1° 949    | 15<br>7<br>"    |
| 50              | Pipardar<br>Bijagarh<br>Bajinath Hill Mark                | h.s.<br>" "           | 4° 62' 6458<br>4° 52' 2126<br>4° 15' 5372  | 42311<br>33276<br>14301    | 8° 014<br>6° 302<br>2° 709         | 63              | Basoha, III<br>Surharua No. 2<br>Nangarh Building         | 65° 11' 47<br>93° 31' 56                | 4° 15' 9196<br>4° 20' 0403<br>3° 76' 0880 | 14428<br>15864<br>5766    | 2° 733<br>3° 004<br>1° 092    | 15<br>7         |
| 51              | Pipardar<br>Magarda<br>Bajinath Hill Mark                 | h.s.<br>" "           | 4° 34' 2668<br>4° 52' 2126<br>4° 30' 8139  | 22012<br>33276<br>20330    | 4° 169<br>6° 302<br>3° 850         | 64              | Basoha, III<br>Surharua No. 1<br>Basoha                   | 99° 5' 19<br>44° 53' 43                 | 3° 93' 039<br>4° 15' 9166<br>4° 01' 2342  | 8571<br>14393<br>10288    | 1° 623<br>2° 726<br>1° 949    | " "             |
| 52              | Bagdharua, I<br>Pipardar<br>Kothadei Platform             | h.s.                  | 4° 89' 6809<br>4° 32' 2718<br>4° 99' 3542  | 78868<br>21024<br>98524    | 14° 937<br>3° 982<br>18° 660       | 65              | Basoha, III<br>Surharua No. 2<br>Basoha                   | 80° 4' 38<br>23° 14' 30                 | 4° 15' 2870<br>4° 15' 8166<br>3° 76' 0880 | 14219<br>14393<br>5766    | 2° 693<br>2° 726<br>1° 092    | " "             |
| 53              | Kandakot, II<br>Basoha, III<br>Mangesar Hill Mark         | h.s.                  | 5° 16' 2144<br>4° 64' 7063<br>5° 10' 9168  | 145259<br>44367<br>128578  | 27° 511<br>8° 403<br>24° 352       | 66              | Basoha, III<br>Surharua No. 1<br>Surharua Hill Mark       | 54° 57' 20<br>95° 40' 5                 | 4° 23' 4792<br>4° 31' 9335<br>4° 01' 2342 | 17171<br>20871<br>10288   | 3° 252<br>3° 953<br>1° 949    | 15<br>7         |
| 54              | Basoha, III<br>Khoradi, IV<br>Mangesar Hill Mark          | h.s.                  | 5° 15' 0105<br>5° 16' 2144<br>5° 00' 6558  | 141288<br>145259<br>101522 | 26° 759<br>27° 511<br>19° 228      | 67              | Garda, VI<br>Sikri, VII<br>Chainpur                       | 18° 0' 55<br>156° 17' 44                | 5° 03' 8413<br>4° 54' 4287<br>5° 15' 2321 | 109248<br>35018<br>142011 | 20° 691<br>6° 632<br>26° 896  | 15<br>7         |

NOTE.—Station Gora, XXXV appertains to the Calcutta Longitudinal Series of the South-East Quadrilateral.

| No. of Triangle | Station                                     | Corrected Plane Angle                   | Distance                         |                          |                            | No. of Triangle | Station                                   | Corrected Plane Angle                    | Distance                         |                          |                            | Theodolite used |
|-----------------|---------------------------------------------|-----------------------------------------|----------------------------------|--------------------------|----------------------------|-----------------|-------------------------------------------|------------------------------------------|----------------------------------|--------------------------|----------------------------|-----------------|
|                 |                                             |                                         | Log. feet                        | Feet                     | Miles                      |                 |                                           |                                          | Log. feet                        | Feet                     | Miles                      |                 |
| 68              | Sikri, VII<br>Barhahi, VIII<br>Chainpur     | h.s.<br>75 50 49<br>41 59 53            | 4.998357<br>5.038413<br>4.877294 | 99622<br>100248<br>75387 | 18.868<br>20.691<br>14.278 | 81              | Sikri, VII<br>Balhui<br>Deobal            | h.s.<br>76 28 3                          | 4.323024<br>4.789118<br>4.779549 | 21039<br>61534<br>60193  | 3.985<br>11.654<br>11.400  | Inch<br>7       |
| 69              | Garda, VI<br>Chainpur<br>Paharia            | h.s.<br>78 35 5<br>58 43 2              | 4.603839<br>4.443832<br>4.544287 | 40164<br>27786<br>35018  | 7.607<br>5.263<br>6.632    | 82              | Kota<br>Balhui<br>Maldia House            | h.s.<br>118 28 38<br>12 46 49            | 4.243678<br>3.644496<br>4.175762 | 17526<br>4411<br>14989   | 3.319<br>0.835<br>2.839    | "               |
| 70              | Chainpur<br>Paharia<br>Mahesari             | h.s.<br>44 20 8<br>118 33 23            | 4.128778<br>4.504562<br>4.603839 | 13452<br>31957<br>40164  | 2.548<br>6.052<br>7.607    | 83              | Kota<br>Balhui<br>Thiari House            | h.s.<br>32 50 30<br>23 28 1              | 3.989874<br>3.855742<br>4.175762 | 9770<br>7174<br>14989    | 1.850<br>1.359<br>2.839    | "               |
| 71              | Garda, VI<br>Chainpur<br>Mahesari           | h.s.<br>65 49 36<br>25 35 24<br>88 35 0 | 4.504562<br>4.179831<br>4.544287 | 31957<br>15130<br>35018  | 6.052<br>2.805<br>6.632    | 84              | Kota<br>Balhui<br>Deheri Siwala           | h.s.<br>76 0 12<br>29 39 5               | 4.179088<br>3.886539<br>4.175762 | 15104<br>7701<br>14989   | 2.861<br>1.458<br>2.839    | "               |
| 72              | Paharia<br>Mahesari<br>Kangarh Siwala       | h.s.<br>21 28 11<br>71 4 2              | 3.602696<br>4.105049<br>4.128778 | 4928<br>12736<br>13452   | 0.933<br>2.412<br>2.548    | 85              | Balhui<br>Deobal<br>Sikandarpur Siwala    | h.s.<br>106 10 23                        | 4.390995<br>4.562956<br>4.323024 | 24603<br>36556<br>21039  | 4.660<br>6.923<br>3.985    | "               |
| 73              | Paharia<br>Mahesari<br>Bhuboah Temple No. 1 | h.s.<br>133 11 56<br>17 47 49           | 4.305867<br>3.928366<br>4.128778 | 20224<br>8479<br>13452   | 3.830<br>1.606<br>2.548    | 86              | Kota<br>Balhui<br>Ilia Siwala             | h.s.<br>92 47 55<br>31 22 9              | 4.257530<br>3.974510<br>4.175762 | 18094<br>9430<br>14989   | 3.427<br>1.786<br>2.839    | "               |
| 74              | Paharia<br>Mahesari<br>Bhuboah Temple No. 2 | h.s.<br>141 9 41<br>20 1 10             | 4.417494<br>4.154594<br>4.128778 | 26151<br>14276<br>13452  | 4.953<br>2.704<br>2.548    | 87              | Kota<br>Balhui<br>Samra Semaphore         | h.s.<br>28 9 20<br>140 40 41             | 4.562544<br>4.690592<br>4.175762 | 36521<br>49045<br>14989  | 6.917<br>9.289<br>2.839    | "               |
| 75              | Chainpur<br>Mahesari<br>Chainpur Masjid     | h.s.<br>71 16 38<br>7 21 19             | 4.489554<br>3.620449<br>4.504562 | 30871<br>4173<br>31957   | 5.847<br>0.790<br>6.052    | 88              | Kota<br>Balhui<br>Parmandapur Semaphore   | h.s.<br>90 55 13<br>62 9 16              | 4.519772<br>4.466384<br>4.175762 | 33096<br>29267<br>14989  | 6.268<br>5.543<br>2.839    | "               |
| 76              | Chainpur<br>Mahesari<br>Chainpur Siwala     | h.s.<br>57 14 0<br>11 9 15              | 4.460956<br>3.822789<br>4.504562 | 28004<br>6650<br>31957   | 5.474<br>1.259<br>6.052    | 89              | Balhui<br>Deobal<br>Parmandapur Semaphore | h.s.<br>24 44 31                         | 4.707659<br>4.519772<br>4.323024 | 51010<br>33096<br>21039  | 9.661<br>6.268<br>3.985    | "               |
| 77              | Garda, VI<br>Sikri, VII<br>Kota             | h.s.<br>12 12 0<br>154 3 4              | 4.836225<br>4.887243<br>5.152321 | 68584<br>77134<br>142011 | 12.989<br>14.609<br>26.896 | 90              | Khoradi, IV<br>Sikri, VII<br>Bhoili       | h.s.<br>16 23 41<br>19 4 9<br>144 32 10  | 4.813245<br>4.876768<br>5.126177 | 65050<br>75295<br>133714 | 12.320<br>14.260<br>25.325 | 15<br>7         |
| 78              | Garda, VI<br>Barhahi, VIII<br>Kota          | h.s.<br>43 46 49<br>101 42 49           | 4.974088<br>4.887243<br>5.124908 | 94208<br>77134<br>133324 | 17.842<br>14.609<br>25.251 | 91              | Khoradi, IV<br>Bhoili<br>Magan Diwana     | h.s.<br>11 10 2<br>25 22 22<br>143 27 36 | 4.389041<br>4.733928<br>4.876768 | 24493<br>54191<br>75295  | 4.639<br>10.263<br>14.260  | 15<br>7         |
| 79              | Sikri, VII<br>Kota<br>Balhui                | h.s.<br>50 35 30<br>118 18 57           | 4.175762<br>4.775349<br>4.836225 | 14989<br>60193<br>68584  | 2.839<br>11.400<br>12.989  | 92              | Sikri, VII<br>Bhoili<br>Magan Diwana      | h.s.<br>15 31 35<br>119 9 48             | 4.389041<br>4.902552<br>4.813245 | 24493<br>79901<br>65050  | 4.639<br>15.133<br>12.320  | 15<br>7         |
| 80              | Sikri, VII<br>Kota<br>Deobal                | h.s.<br>85 35 26                        | 4.548825<br>4.789118<br>4.836225 | 35385<br>61534<br>68584  | 6.702<br>11.654<br>12.989  | 93              | Khoradi, IV<br>Magan Diwana<br>Bheri      | h.s.<br>69 30 0<br>66 32 1<br>43 57 59   | 4.864008<br>4.854929<br>4.733928 | 73115<br>71063<br>54191  | 13.848<br>13.561<br>10.263 | 15<br>7         |

## SECONDARY TRIANGULATION. TRIANGLES.

15—0.

| No. of Triangle | Station                                                  | Corrected Plane Angle | Distance                         |                         |                            | No. of Triangle | Station                                    | Corrected Plane Angle | Distance                         |                         |                            | Theodolite used |
|-----------------|----------------------------------------------------------|-----------------------|----------------------------------|-------------------------|----------------------------|-----------------|--------------------------------------------|-----------------------|----------------------------------|-------------------------|----------------------------|-----------------|
|                 |                                                          |                       | Log. feet                        | Feet                    | Miles                      |                 |                                            |                       | Log. feet                        | Feet                    | Miles                      |                 |
| 94              | Khorádi, IV<br>Bhoili<br>Bheri                           | h.s.<br>" "           | 4.855295<br>4.854929<br>4.876768 | 71663<br>71603<br>75295 | 13.573<br>13.501<br>14.260 | 103             | Bhoili<br>Bheri<br>Chunar Fort             | h.s.<br>" "           | 4.419725<br>4.765527<br>4.855295 | 26286<br>58281<br>71663 | 4.978<br>11.038<br>13.573  | Inch<br>7<br>"  |
| 95              | Bhoili<br>Bheri<br>Rája Kirpál-ka-Pahár                  | h.s.<br>" "           | 4.861536<br>4.875562<br>4.855295 | 72700<br>37632<br>71663 | 13.769<br>7.127<br>13.573  | 104             | Bheri<br>Chunar Fort<br>Murli              | h.s.<br>s.<br>h.s.    | 4.380951<br>4.098273<br>4.410239 | 24041<br>12539<br>25718 | 4.553<br>2.375<br>4.871    | "<br>"<br>"     |
| 96              | Magan Diwána<br>Bheri<br>Rája Kirpál-ka-Pahár            | h.s.<br>" "           | 4.861536<br>4.136169<br>4.864008 | 72700<br>13683<br>73115 | 13.769<br>2.591<br>13.848  | 105             | Bheri<br>Chunar Fort<br>Murli              | h.s.<br>" "           | 4.379351<br>4.098273<br>4.419725 | 23953<br>12539<br>26286 | 4.536<br>2.375<br>4.978    | "<br>"<br>"     |
| 97              | Magan Diwána<br>Rája Kirpál-ka-Pahár<br>Latifgarh Fort   | h.s.<br>" "           | 3.760587<br>4.281210<br>4.136169 | 5762<br>19108<br>13683  | 1.091<br>3.619<br>2.591    | 106             | Bheri<br>Chunar Fort<br>Tamalganj Building | h.s.<br>s.<br>h.s.    | 4.108111<br>4.177756<br>4.410239 | 12827<br>15058<br>25718 | 2.429<br>2.852<br>4.871    | "<br>"<br>"     |
| 98              | Magan Diwána<br>Rája Kirpál-ka-Pahár<br>Ahraura Temple   | h.s.<br>" "           | 4.014537<br>3.973479<br>4.136169 | 10340<br>9408<br>13683  | 1.958<br>1.782<br>2.591    | 107             | Bheri<br>Chunar Fort<br>Bhoili Semaphore   | h.s.<br>s.<br>h.s.    | 4.762254<br>4.859799<br>4.410239 | 57843<br>72410<br>25718 | 10.955<br>13.714<br>4.871  | "<br>"<br>"     |
| 99              | Magan Diwána<br>Rája Kirpál-ka-Pahár<br>Darhana Building | h.s.<br>" "           | 4.228683<br>4.011073<br>4.136169 | 16931<br>10258<br>13683 | 3.207<br>1.943<br>2.591    | 108             | Magan Diwána<br>Bheri<br>Chunar Church     | h.s.<br>" "           | 4.479904<br>4.818688<br>4.864008 | 30193<br>65916<br>73115 | 5.718<br>12.484<br>13.848  | "<br>"<br>"     |
| 100             | Khorádi, IV<br>Magan Diwána<br>Chunar Fort               | h.s.<br>s.            | 4.827239<br>4.925066<br>4.733928 | 67180<br>84152<br>54191 | 12.723<br>15.938<br>10.263 | 109             | Bheri<br>Murli<br>Miria Temple             | h.s.<br>" "           | 4.374275<br>4.438451<br>4.098273 | 23674<br>27444<br>12539 | 4.484<br>5.198<br>2.375    | "<br>"<br>"     |
| 101             | Magan Diwána<br>Bheri<br>Chunar Fort                     | h.s.<br>" s.          | 4.410239<br>4.827239<br>4.864008 | 25718<br>67180<br>73115 | 4.871<br>12.723<br>13.848  | 110             | Bheri<br>Chunar Fort<br>Sultánpur Stables  | h.s.<br>s.            | 4.303100<br>4.649605<br>4.410239 | 20096<br>44628<br>25718 | 3.806<br>8.452<br>4.871    | "<br>"<br>"     |
| 102             | Bhoili<br>Rája Kirpál-ka-Pahár<br>Chunar Fort            | h.s.<br>" "           | 4.862780<br>4.765527<br>4.575562 | 72909<br>5281<br>37632  | 13.808<br>11.038<br>7.127  | 111             | Sikri, VII<br>Bhoili<br>Benares Mosque     | h.s.                  | 4.895638<br>4.882236<br>4.813245 | 78639<br>76249<br>65050 | 14.894<br>14.441<br>12.320 | 15<br>7         |

February 1879.

J. B. N. HENNESSEY,

In charge of Computing Office.

# GORA MERIDIONAL SERIES.

## AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL, PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

The following table contains, in the first column, the name of each Principal, Principal-Auxiliary, or Secondary Station, at which azimuths of surrounding Points have been measured; immediately followed by those azimuths. The second column contains the number of the triangle which gives the distance between the Station and the Point.

| Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance | Name of station with azimuths of surrounding points | No. of triangle giving distance |
|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|-----------------------------------------------------|---------------------------------|
| BAGHARUA, I<br>Kandwa                               | 36                              | BARHUI h.s.<br>Deobal                               | 81                              | BARHANI, VIII<br>Basoha, III                        | 10                              |
| Gora, XXXV*                                         | 1                               | Sikandarpur Siwála                                  | 85                              | Sikri, VII                                          | 7                               |
| Khempur                                             | 34                              | Samra Semaphore                                     | 87                              | Hirdepur, IX                                        | 11                              |
| Kothadei Platform                                   | 52                              | Sikri, VII                                          | 79                              | Barhanpur, X                                        | 12                              |
| Pipardar                                            | 33                              | Parnundápur Semaphore                               | 88                              | Garda, VI                                           | 7                               |
| Magarda                                             | 42                              | Ilia Siwála                                         | 86                              | Chainpur                                            | 68                              |
| Bijágarh                                            | 44                              | Deheri Siwála                                       | 84                              |                                                     |                                 |
| Kandákot, II                                        | 2                               | Thiari House                                        | 83                              |                                                     |                                 |
| Basoha, III                                         | 3                               | Málda House                                         | 82                              | BARHANPUR, X                                        |                                 |
| Moraina                                             | 58                              | Kota                                                | 79                              | Hirdepur, IX                                        | 12                              |
| Khám, V                                             | 4                               |                                                     |                                 | Gaura, XI                                           | 13                              |
| Sewádhí, XXXVIII*                                   | 1                               |                                                     |                                 | Kanaun, XII                                         | 14                              |
|                                                     |                                 |                                                     |                                 | Barháni, VIII                                       | 12                              |
| BALARIAGANJ, XVII                                   |                                 | BANIAPAR, XVIII                                     |                                 |                                                     |                                 |
| Samenda, XV                                         | 19                              | Balariáganj, XVII                                   | 20                              |                                                     |                                 |
| Barhiáchak, XIX                                     | 21                              | Barhiáchak, XIX                                     | 21                              |                                                     |                                 |
| Baniápár, XVIII                                     | 20                              | Ráigarh, XX                                         | 22                              | BARHACHAK, XIX                                      | 23                              |
| Bhadir, XVI                                         | 19                              | Bhadir, XVI                                         | 20                              | Blisia, XXI                                         | 22                              |
|                                                     |                                 |                                                     |                                 | Ráigarh, XX                                         | 21                              |
|                                                     |                                 |                                                     |                                 | Baniápár, XVIII                                     | 21                              |
|                                                     |                                 |                                                     |                                 | Balariáganj, XVII                                   | 21                              |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.



## AZIMUTHS OF STATIONS AND INTERSECTED POINTS.

17—o.

| Name of station with azimuths of surrounding points                                                                                                                                                                             | No. of triangle giving distance                                      | Name of station with azimuths of surrounding points                                                          | No. of triangle giving distance                                                                                                                                                            | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | No. of triangle giving distance                                                                                                                                                                                                     | Name of station with azimuths of surrounding points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | No. of triangle giving distance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BASOHA, III<br>Nangarh Building<br>Mangesar Hill Mark<br>Kandakot, II<br>Surharia No. 2<br>Khoradi, IV<br>Surharia No. 1<br>Basoha<br>Surharia Hill Mark<br>Sikri, VII<br>Barhani, VIII<br>Garda, VI<br>Kham, V<br>Bagdharua, I | 63<br>53<br>3<br>62<br>8<br>60<br>64<br>66<br>6<br>10<br>5<br>4<br>3 | h.s.<br>h.s.<br>h.s.<br>h.s.<br>h.s.<br>h.s.<br>h.s.<br>h.s.<br>h.s.<br>h.s.<br>h.s.<br>h.s.<br>h.s.<br>h.s. | 0 1 1<br>4 23 12<br>27 36 25<br>44 54 31 21<br>69 34 59<br>94 46 28 80<br>110 14 53<br>146 15 51<br>165 12 13<br>169 45 32 33<br>196 38 23 95<br>254 49 13 41<br>293 1 34 57<br>329 6 8 51 | BHOILI h.s.<br>Chunar Fort<br>Benares Mosque<br>Sikri, VII<br>Magan Diwana<br>Bhajarh h.s.<br>Gidwas Hill Mark<br>Rangarh Building<br>Bagdharua, I<br>Magarda<br>Bajunath Hill Mark<br>Pipardar<br>CHAMPUR h.s.<br>Sikri, VII<br>Barhani, VIII<br>Champur Masjid<br>Champur Siwala<br>Paharia<br>Mahesari<br>Garda, VI<br>CHIT BISRAM, XIV<br>Kanaun, XII<br>Kharakpur, XIII<br>Samenda, XV<br>Bhadir, XVI<br>CHUNAR Fort s.<br>Bheri<br>Tamalganj Building<br>Muri<br>Sultanpur Stables<br>Bhoili Semaphore<br>Magan Diwana<br>Khoradi, IV<br>DEOBAL h.s.<br>Sikandarpur Siwala<br>Sikri, VII<br>Parmandapur Semaphore<br>Bahui<br>Kota<br>DEOKALI, XXIII<br>Muhammadpur, XXV<br>Saraia, XXIV<br>Katwar, XXII<br>Bhisia, XXI | 102<br>111<br>90<br>91<br>49<br>57<br>44<br>43<br>50<br>43<br>67<br>68<br>75<br>76<br>69<br>70<br>67<br>16<br>16<br>17<br>18<br>101<br>106<br>104<br>110<br>107<br>100<br>100<br>85<br>80<br>89<br>81<br>80<br>27<br>26<br>25<br>25 | 0 1 1<br>281 11 55 17<br>357 21 15 13<br>7 23 31 43<br>74 55 55 00<br>h.s.<br>130 14 58 80<br>148 15 54<br>161 49 47 32<br>214 5 30<br>226 50 59<br>1 24 35 25<br>176 20 44 06<br>238 43 17 98<br>304 31 17 37<br>56 45 5 03<br>101 16 55 19<br>357 5 26 76<br>158 45 21 41<br>169 20 49<br>h.s.<br>175 43 42<br>h.s.<br>179 4 18<br>h.s.<br>192 45 33<br>206 59 21 12<br>209 34 35<br>270 36 6<br>282 48 30 21<br>6 9 42 58<br>181 24 25 72<br>228 53 29 88<br>304 4 36 79<br>58 47 17 01<br>127 50 16 12<br>180 0 5 61<br>359 11 2 57 | DHARAMSINGUA, LVI*<br>Gharbaria, LVIII*<br>Nandaur, XXVII<br>GARDA, VI<br>Kham, V<br>Basoha, III<br>Kota<br>Sikri, VII<br>Champur<br>Barhani, VIII<br>Mahesari<br>Paharia<br>GAURA, XI<br>Hirdepur, IX<br>Kharakpur, XIII<br>Kanaun, XII<br>Barhanpur, X<br>GHARBARIA, LVIII*<br>Nandaur, XXVII<br>Dharamsingua, LVI*<br>Rajabari, XXVI<br>GORA, XXXV†<br>Kandakot, II<br>Bahradol H. Mark (Heliotrope)<br>Pipardar<br>Murgari H. Mark (Heliotrope)<br>Khempur<br>Bagdharua, I<br>Kandwa<br>Mirgarani<br>Sowadhi, XXXVIII†<br>HIRDEPUR, IX<br>Sikri, VII<br>Gaura, XI<br>Barhanpur, X<br>Barhani, VIII<br>KANAUN, XII<br>Gaura, XI<br>Kharakpur, XIII<br>Chit Bisram, XIV<br>Barhanpur, X | 31<br>31<br>5<br>5<br>77<br>6<br>67<br>7<br>71<br>69<br>13<br>15<br>14<br>13<br>30<br>31<br>30<br>2<br>39<br>32<br>45<br>35<br>1<br>37<br>40<br>1<br>11<br>13<br>12<br>11<br>14<br>15<br>16<br>14 |

\* Of the North-East Longitudinal Series. † Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

GORA MERIDIONAL SERIES.

[illegible]

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral. † Of the North-East Longitudinal Series.



## GORA MERIDIONAL SERIES.

### CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.— $\lambda$  stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically,  $H_s$  for the Height when found by spirit leveling, and  $h$  for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of  $\lambda$  and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c., secondary stations by the letters h.s. and s. The names in italics are those of the territories, states or districts in which the stations or points are situated. For alterations of district and other boundaries and consequent transfer of stations from one district to another since date of survey, see Addendum following page 8—0.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Ahraura Temple.<br/>(<i>Mirzapur</i>)</p> <p style="text-align: center;">o ' "</p> <p><math>\lambda</math> 25 1 19.4<br/>L 83 4 19.0<br/>No. 98</p> <p>Azamgarh Church,<br/>(<i>Azamgarh</i>) N.E. Spire.</p> <p><math>\lambda</math> 26 3 3.3<br/>L 83 13 21.4</p> <p>Azamgarh Temple.<br/>(<i>Azamgarh</i>) On Siwála Ghat.</p> <p><math>\lambda</math> 26 3 57.5<br/>L 83 13 52.0</p> <p>Bagdharua, I.<br/>(<i>Mirzapur</i>. Vide page 3—0.)</p> <p><math>\lambda</math> 24 32 49.67<br/>L 83 32 13.14<br/>H 2108<br/><math>h</math> 16<br/>No. 1</p> | <p>Bahrádol Hill Mark (Heliotrope).<br/>(<i>Mirzapur</i>) On bank of Dol nadi about 3 miles W. of Dadhi and 2 miles E. of Bahrádol village.</p> <p style="text-align: center;">o ' "</p> <p><math>\lambda</math> 24 16 27.19<br/>L 83 14 18.75<br/>Nos. 38, 39</p> <p>Baijnáth Hill Mark.<br/>(<i>Mirzapur</i>) On platform, about 2 miles S.E. of village so called and the same distance N.E. of Tharia village.</p> <p><math>\lambda</math> 24 31 27.05<br/>L 83 20 22.69<br/>Nos. 50, 51</p> <p>Bajaur Hill Mark.<br/>(<i>Mirzapur</i>) About 4 miles N.E. of Chokahra village.</p> <p><math>\lambda</math> 24 56 30.67<br/>L 82 58 8.77</p> <p>Bakta House.<br/>(<i>Basti</i>) Flag on Gosáin's house on the Rapti river.</p> <p><math>\lambda</math> 26 45 32.6<br/>L 83 16 34.3</p> | <p>Balariáganj, XVII.<br/>(<i>Azamgarh</i>. Vide page 6—0.)</p> <p style="text-align: center;">o ' "</p> <p><math>\lambda</math> 26 12 0.37<br/>L 83 16 23.13<br/><math>H_s</math> 259.50*<br/><math>h</math> 33<br/>No. 19</p> <p>Balhui h.s.<br/>(<i>Mirzapur</i>) On the highest part of a hill about <math>3\frac{1}{2}</math> miles W. of the large village of Ilia and <math>\frac{1}{4}</math> mile N.E. of the small village of Mankapra; pargana Kera Mangraur.</p> <p><math>\lambda</math> 25 3 2.24<br/>L 83 19 51.91<br/>No. 79</p> <p>Baniápár, XVIII.<br/>(<i>Azamgarh</i>. Vide page 6—0.)</p> <p><math>\lambda</math> 26 15 7.72<br/>L 83 25 29.46<br/><math>H_s</math> 244.07*<br/><math>h</math> 25<br/>No. 20</p> |

\* These heights refer to the mark-stone let into the ground floor of the tower.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Báukot Temple.<br/>(Azamgarh)</p> <p>λ 26 7 34.1<br/>L 83 16 55.1</p> <p>Barhaj Temple.<br/>(Gorakhpur) On left bank of the Gogra river.</p> <p>λ 26 16 28.6<br/>L 83 46 13.4</p> <p>Barhalganj Temple No. 1,<br/>(Gorakhpur) Highest.</p> <p>λ 26 16 47.2<br/>L 83 33 18.7</p> <p>Barhalganj Temple No. 2.<br/>(Gorakhpur)</p> <p>λ 26 16 49.0<br/>L 83 32 49.2</p> <p>Barhalganj Temple No. 3.<br/>(Gorakhpur)</p> <p>λ 26 16 48.3<br/>L 83 32 52.3</p> <p>Barhalganj Temple No. 4.<br/>(Gorakhpur)</p> <p>λ 26 16 48.4<br/>L 83 32 52.6</p> <p>Barhalganj Temple No. 5.<br/>(Gorakhpur)</p> <p>λ 26 16 48.6<br/>L 83 32 51.2</p> <p>Barhalganj Temple No. 6.<br/>(Gorakhpur)</p> <p>λ 26 16 49.6<br/>L 83 32 57.8</p> <p>Barhání, VIII.<br/>(Benares. Vide page 4—0.)</p> <p>λ 25 17 49.56<br/>L 83 27 21.90<br/>H<sub>s</sub> 275.07*<br/>h 27<br/>Nos. 7, 10</p> <p>Barhanpur, X.<br/>(Ghazipur. Vide page 5—0.)</p> <p>λ 25 32 6.83<br/>L 83 26 28.87<br/>H<sub>s</sub> 256.58†<br/>h 22<br/>No. 12</p> | <p>Barhiáchak, XIX.<br/>(Gorakhpur. Vide page 6—0.)</p> <p>λ 26 21 1.50<br/>L 83 15 53.77<br/>H 273<br/>h 28<br/>No. 21</p> <p>Basoha, III.<br/>(Mirzapur. Vide page 4—0.)</p> <p>λ 24 52 59.91<br/>L 83 19 1.67<br/>H 1256<br/>h Not forthcoming<br/>No. 3</p> <p>Basoha h.s.<br/>(Mirzapur) On a knoll appertaining to the Bindhachal range, and N.N.W. of Basoha principal station from which it is separated by a branch of the Matani stream; pargana Kera Mangraur. A platform marks the station.</p> <p>λ 24 54 58.5<br/>L 83 17 34.8<br/>Nos. 64, 65</p> <p>Benares, Bisheshwar Temple,<br/>(Benares) N. Spire.</p> <p>λ 25 18 39.2<br/>L 83 3 12.2</p> <p>Benares, Mán Mandir.<br/>(Benares) The Hindu Observatory.</p> <p>λ 25 18 24.9<br/>L 83 3 13.3</p> <p>Benares Masjid.<br/>(Benares) Dome of Gyánbápi Masjid.</p> <p>λ 25 18 38.0<br/>L 83 3 12.4</p> <p>Benares Mosque,<br/>(Benares) Minaret, E. pillar.</p> <p>λ 25 18 54.1<br/>L 83 3 38.3<br/>No. 111</p> <p>Benares, Rájghat s.<br/>(Benares) On building in old fort.</p> <p>λ 25 19 35.59<br/>L 83 4 39.99</p> <p>Benares, Sikraul Observatory.<br/>(Benares)</p> <p>λ 25 20 1.8<br/>L 83 1 43.9</p> | <p>Benares, Siwála Ghat.<br/>(Benares)</p> <p>λ 25 17 40.5<br/>L 83 3 0.3</p> <p>Benares, Tulsi Dás's Ghat.<br/>(Benares)</p> <p>λ 25 17 22.0<br/>L 83 2 57.5</p> <p>Benares, Turret,<br/>(Benares) High, in city.</p> <p>λ 25 18 31.3<br/>L 83 3 4.5</p> <p>Bhadir, XVI.<br/>(Azamgarh. Vide page 6—0.)</p> <p>λ 26 5 19.87<br/>L 83 26 25.82<br/>H 283<br/>h 33<br/>No. 18</p> <p>Bhaurai Building.<br/>(Mirzapur) White square building in village.</p> <p>λ 25 6 15.4<br/>L 82 52 7.5</p> <p>Bheri h.s.<br/>(Mirzapur) About a mile S. of Kanwahi and 1½ miles S.E. of Marfa village. A platform marks the station.</p> <p>λ 25 3 41.77<br/>L 82 52 43.95<br/>Nos. 93, 94</p> <p>Bhisia, XXI.<br/>(Gorakhpur. Vide page 6—0.)</p> <p>λ 26 28 57.29<br/>L 83 12 27.30<br/>H 283<br/>h 23<br/>No. 23</p> <p>Bhoili h.s.<br/>(Mirzapur) On the highest point of the hill which has the village of that name at its foot and the Semaphore on its shoulder; pargana Bhoili. A platform denotes the site of observation.</p> <p>λ 25 6 1.55<br/>L 83 5 28.25<br/>No. 90</p> <p>Bhoili Mosque,<br/>(Mirzapur) White, on S. face of a small hill, about 200 yards N. of village.</p> <p>λ 25 6 14.3<br/>L 83 5 44.4</p> |

\* This height refers to the mark-stone let into the upper surface of the pillar. † This height refers to the mark-stone let into the ground floor of the tower.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Bhoili Semaphore.<br/>(<i>Mirzapur</i>)</p> <p>° ' "</p> <p>λ 25 6 9.6<br/>L 83 5 34.7<br/>No. 107</p> <p>Bhubooah Temple No. 1.<br/>(<i>Shahabad</i>)</p> <p>λ 25 1 24.4<br/>L 83 38 58.4<br/>No. 73</p> <p>Bhubooah Temple No. 2.<br/>(<i>Shahabad</i>)</p> <p>λ 25 2 13.8<br/>L 83 39 34.5<br/>No. 74</p> <p>Bijaigarh h.s.<br/>(<i>Mirzapur</i>) On building in fort.</p> <p>λ 24 34 29.59<br/>L 83 13 30.11<br/>Nos. 43, 44</p> <p>Biktamb Hill Stone.<br/>(<i>Gya</i>)</p> <p>λ 24 14 9.8<br/>L 83 48 7.3</p> <p>See Synoptical Vol. of the Calcutta Longitudinal<br/>Series of the South-East Quadrilateral.</p> <p>Bisheshwarpur Factory,<br/>(<i>Mirzapur</i>) Godown.</p> <p>λ 25 12 33<br/>L 83 3 39</p> <p>Budhāsali h.s.<br/>(<i>Shahabad</i>) On a swell of ground about 1½ miles<br/>S. of Khām principal station; pargana Chainpur.<br/>A small heap of stones marks the station.</p> <p>λ 24 45 51.86<br/>L 83 33 9.56</p> <p>Chainpur h.s.<br/>(<i>Shahabad</i>) On a hill about 1 mile S.W. of the<br/>town of that name; pargana Chainpur.</p> <p>λ 25 1 49.86<br/>L 83 31 34.68<br/>Nos. 67, 68</p> <p>Chainpur Indigo Factory.<br/>(<i>Shahabad</i>) Chimney of bungalow.</p> <p>λ 25 1 37.6<br/>L 83 32 5.0</p> <p>Chainpur Masjid,<br/>(<i>Shahabad</i>) Small, near S.W. limit of village.</p> <p>λ 25 2 15.7<br/>L 83 32 10.1<br/>No. 75</p> | <p>Chainpur Mausoleum,<br/>(<i>Shahabad</i>) Old high, top of dome.</p> <p>° ' "</p> <p>λ 25 1 49.5<br/>L 83 31 52.8</p> <p>Chainpur Siwāla,<br/>(<i>Shahabad</i>) Small and Elegant, W. of Chainpur<br/>village.</p> <p>λ 25 2 17.3<br/>L 83 32 40.4<br/>No. 76</p> <p>Chakia Bungalow.<br/>(<i>Mirzapur</i>) Rāja's bungalow.</p> <p>λ 25 2 45.4<br/>L 83 15 54.5</p> <p>Chakia Hill,<br/>(<i>Mirzapur</i>) Small.</p> <p>λ 25 2 34.6<br/>L 83 16 4.8</p> <p>Chakia Siwāla,<br/>(<i>Mirzapur</i>) High, W. of tank.</p> <p>λ 25 2 44.3<br/>L 83 15 43.1</p> <p>Chikda Temple.<br/>(<i>Mirzapur</i>) On ghat.</p> <p>λ 25 12 19.8<br/>L 83 3 8.6</p> <p>Chit Bistrām, XIV.<br/>(<i>Azamgarh</i>. <i>Vide page 5—o.</i>)</p> <p>λ 25 54 2.82<br/>L 83 26 18.58<br/>Hs 251.29*<br/>h 23<br/>No. 16</p> <p>Chunar Church,<br/>(<i>Mirzapur</i>) Tower, in Cantonment.</p> <p>λ 25 7 50.5<br/>L 82 55 46.3<br/>No. 108</p> <p>Chunar Fort,<br/>(<i>Mirzapur</i>) Flagstaff.</p> <p>λ 25 7 30.0<br/>L 82 55 1.6<br/>Nos. 102, 103</p> <p>Chunar Fort s.<br/>(<i>Mirzapur</i>) On building called the <i>Baramahal</i> in<br/>centre of Barracks.</p> <p>λ 25 7 19.10<br/>L 82 55 9.99<br/>Nos. 100, 101</p> | <p>Chunar Monument,<br/>(<i>Mirzapur</i>) Highest, in burial ground at foot of<br/>the fort.</p> <p>° ' "</p> <p>λ 25 7 18.1<br/>L 82 55 3.0</p> <p>Chunar Semaphore.<br/>(<i>Mirzapur</i>)</p> <p>λ 25 7 16.2<br/>L 82 55 9.2</p> <p>Chunar Temple.<br/>(<i>Mirzapur</i>) Near ferry-ghat.</p> <p>λ 25 7 36.6<br/>L 82 55 17.2</p> <p>Chunar, Tikor Dargah.<br/>(<i>Mirzapur</i>) In karbala.</p> <p>λ 25 6 54.9<br/>L 82 54 43.8</p> <p>Chunar, Tikor House.<br/>(<i>Mirzapur</i>) Staircase of Mr. DeGruyther's house.</p> <p>λ 25 7 3.7<br/>L 82 54 51.9</p> <p>Chunar, Tikor Temple.<br/>(<i>Mirzapur</i>) On bank of the Ganges.</p> <p>λ 25 7 8.9<br/>L 82 54 56.6</p> <p>Danwār Hill Mark.<br/>(<i>Garkhāt States, Chota Nagpore Division</i>) In<br/>Surgūju.</p> <p>λ 23 57 33.50<br/>L 83 30 9.24</p> <p>See Synoptical Vol. of the Calcutta Longitudinal<br/>Series of the South-East Quadrilateral.</p> <p>Darhana Building,<br/>(<i>Mirzapur</i>) White and black.</p> <p>λ 25 1 31.1<br/>L 83 7 38.2<br/>No. 99</p> <p>Deheri Siwāla.<br/>(<i>Mirzapur</i>) In village.</p> <p>λ 25 4 8.6<br/>L 83 22 19.1<br/>No. 84</p> <p>Deobal h.s.<br/>(<i>Mirzapur</i>) On a hill about 1 mile S.E. of Chakia,<br/>a large village and country seat of the Rāja of<br/>Benares; pargana Kera Mangraur.</p> <p>λ 25 1 55.44<br/>L 83 16 15.19<br/>Nos. 80, 81</p> |

\* This height refers to the mark-stone let into the ground floor of the tower.

| Name of station, district, description,<br>co-ordinates &c.                                             | Name of station, district, description,<br>co-ordinates &c.                                                                   | Name of station, district, description,<br>co-ordinates &c.                                                                         |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Deokali, XXIII.<br>(Gorakhpur. Vide page 7—0.)                                                          | Dharua Temple No. 1.<br>(Ghazipur) In plain E. of village.                                                                    | Ganges River No. 6 s.<br>(Mirzapur) On right bank, on a square stone platform near the northern limits of the Chunar parade ground. |
| $\lambda$ 26° 37' 54" II<br>$L$ 83° 8' 25" 98<br>$H$ 293<br>$h$ 23<br>No. 25                            | $\lambda$ 25° 32' 41" 0<br>$L$ 83° 27' 49" 2                                                                                  | $\lambda$ 25° 8' 14" 77<br>$L$ 82° 55' 46" 17                                                                                       |
| Deopura h.s.<br>(Mirzapur) About 4 miles S.W. of Rámpur village.                                        | Dharua Temple No. 2.<br>(Ghazipur) On road side.                                                                              | Ganges River No. 7 s.<br>(Mirzapur) On N. high bank near the village of Chamrauli.                                                  |
| $\lambda$ 24° 56' 27" 54<br>$L$ 82° 49' 25" 89<br>See Synoptical Vol. of the Gurwáni Meridional Series. | $\lambda$ 25° 32' 44" I<br>$L$ 83° 27' 34" 0                                                                                  | $\lambda$ 25° 8' 50" 22<br>$L$ 82° 55' 12" 55                                                                                       |
| Deori Fort s.<br>(Azamgarh)                                                                             | Dhaurára Siwála.<br>(Mirzapur) In village.                                                                                    | Ganges River No. 8 s.<br>(Mirzapur) On E. bank, in the Khádar lands formed by the river.                                            |
| $\lambda$ 26° 16' 28" 2I<br>$L$ 83° 33' 0" 76                                                           | $\lambda$ 25° 6' 38" 5<br>$L$ 82° 52' 52" 7                                                                                   | $\lambda$ 25° 8' 41" 75<br>$L$ 82° 56' 8" 25                                                                                        |
| Deori Ghat s.<br>(Azamgarh) At Indigo Factory bungalow.                                                 | Dibar Hill Mark.<br>(Mirzapur) About 1½ miles N. of Khadra and 2 miles N.E. of Purwa Ganpat. A platform marks the station.    | Ganges River No. 9 s.<br>(Mirzapur) On W. bank, 1 mile S. of the station of Sultánpur.                                              |
| $\lambda$ 26° 16' 20" 5I<br>$L$ 83° 33' 35" 30                                                          | $\lambda$ 24° 38' 24" 00<br>$L$ 82° 55' 11" 17<br>No. 56                                                                      | $\lambda$ 25° 9' 57" 77<br>$L$ 82° 55' 31" 39                                                                                       |
| Deori Masjid, N. Minaret.<br>(Azamgarh)                                                                 | Gadápahári Building.<br>(Mirzapur) Small stone building on hill.                                                              | Ganges River No. 10 s.<br>(Mirzapur) In the alluvial land on E. bank opposite to Sultánpur.                                         |
| $\lambda$ 26° 16' 28" 2<br>$L$ 83° 33' 3" 7                                                             | $\lambda$ 25° 6' 49" 8<br>$L$ 82° 54' 57" I                                                                                   | $\lambda$ 25° 10' 29" 66<br>$L$ 82° 56' 42" 83                                                                                      |
| Deori Masjid, S. Cupola.<br>(Azamgarh)                                                                  | Ganges River No. 1 s.<br>(Mirzapur) On N. bank, ½ a mile E. of Silpi.                                                         | Ganges River No. 11 s.<br>(Mirzapur) On W. bank, within the compound of a bungalow belonging to Mr. DeGruyther.                     |
| $\lambda$ 26° 16' 28" I<br>$L$ 83° 33' 3" 6                                                             | $\lambda$ 25° 7' 2" 87<br>$L$ 82° 53' 13" 77                                                                                  | $\lambda$ 25° 10' 54" 87<br>$L$ 82° 56' 12" 64                                                                                      |
| Deori Masjid, S. Minaret.<br>(Azamgarh)                                                                 | Ganges River No. 2 s.<br>(Mirzapur) On S. bank about 350 yards W. of Tamálganj.                                               | Ganges River No. 12 s.<br>(Mirzapur) On E. bank, in the Khádar lands formed by the river.                                           |
| $\lambda$ 26° 16' 29" 7<br>$L$ 83° 33' 10" 8                                                            | $\lambda$ 25° 6' 36" 56<br>$L$ 82° 53' 44" 36                                                                                 | $\lambda$ 25° 11' 4" 22<br>$L$ 82° 56' 50" 03                                                                                       |
| Deori Temple No. 1.<br>(Azamgarh)                                                                       | Ganges River No. 3 s.<br>(Mirzapur) On N. bank, ½ of a mile S.E. of Mowai.                                                    | Ganges River No. 13 s.<br>(Mirzapur) On high W. bank, ½ a mile E. of the Sultánpur burial ground.                                   |
| $\lambda$ 26° 16' 28" 4<br>$L$ 83° 33' 7" 0                                                             | $\lambda$ 25° 7' 22" 65<br>$L$ 82° 54' 8" 74                                                                                  | $\lambda$ 25° 11' 42" 05<br>$L$ 82° 56' 33" 18                                                                                      |
| Deori Temple No. 2.<br>(Azamgarh)                                                                       | Ganges River No. 4 s.<br>(Mirzapur) On N. bank, ½ a mile S.E. of Misirpura village.                                           |                                                                                                                                     |
| $\lambda$ 26° 16' 29" 6<br>$L$ 83° 33' 11" 2                                                            | $\lambda$ 25° 7' 35" 66<br>$L$ 82° 54' 35" 97                                                                                 |                                                                                                                                     |
| Dharamsingua, LVI.*<br>(Gorakhpur. Vide page 7—0.)                                                      | Ganges River No. 5 s.<br>(Mirzapur) On N. bank above the ferry-ghat and about 20 yards N. of the road from Chunar to Benares. |                                                                                                                                     |
| $\lambda$ 27° 4' 50" 15<br>$L$ 83° 6' 33" 09<br>$H$ 309<br>$h$ 25<br>No. 31                             | $\lambda$ 25° 7' 56" 11<br>$L$ 82° 54' 50" 04                                                                                 |                                                                                                                                     |

\* Of the North-East Longitudinal Series.

| Name of station, district, description,<br>co-ordinates &c.                                                                                   | Name of station, district, description,<br>co-ordinates &c.                          | Name of station, district, description,<br>co-ordinates &c.                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Ganges River No. 14 s.<br>(Mirzapur) On E. bank, in the Khádar lands about<br>½ a mile W. of Saipur village.<br>λ 25 11 28.35<br>L 82 57 8.38 | Ganges River No. 24 s.<br>(Benares) On left bank.<br>λ 25 12 38.31<br>L 82 58 59.34  | Ganges River No. 35 s.<br>(Benares) On left bank.<br>λ 25 13 0.42<br>L 83 2 17.86                                   |
| Ganges River No. 15 s.<br>(Mirzapur) On high W. bank.<br>λ 25 11 58.11<br>L 82 56 52.67                                                       | Ganges River No. 25 s.<br>(Mirzapur) On right bank.<br>λ 25 12 15.84<br>L 83 0 0.68  | Ganges River No. 36 s.<br>(Mirzapur) On right bank.<br>λ 25 12 13.62<br>L 83 2 55.60                                |
| Ganges River No. 16 s.<br>(Mirzapur) On E. bank, in the Khádar lands form-<br>ed by the river.<br>λ 25 11 41.00<br>L 82 57 21.27              | Ganges River No. 26 s.<br>(Benares) On left bank.<br>λ 25 12 41.47<br>L 82 59 51.70  | Ganges River No. 37 s.<br>(Mirzapur) On right bank.<br>λ 25 12 59.12<br>L 83 3 46.51                                |
| Ganges River No. 17 s.<br>(Mirzapur) On W. bank.<br>λ 25 12 8.34<br>L 82 57 13.50                                                             | Ganges River No. 27 s.<br>(Benares) On left bank.<br>λ 25 12 42.27<br>L 83 0 16.87   | Ganges River No. 38 s.<br>(Benares) On left bank.<br>λ 25 13 12.46<br>L 83 2 52.67                                  |
| Ganges River No. 18 s.<br>(Mirzapur) On right bank.<br>λ 25 12 1.36<br>L 82 57 59.33                                                          | Ganges River No. 28 s.<br>(Mirzapur) On right bank.<br>λ 25 12 15.95<br>L 83 0 25.48 | Ganges River No. 39 s.<br>(Benares) On left bank.<br>λ 25 13 50.79<br>L 83 3 24.99                                  |
| Ganges River No. 19 s.<br>(Mirzapur) On left bank.<br>λ 25 12 18.38<br>L 82 57 37.62                                                          | Ganges River No. 29 s.<br>(Benares) On left bank.<br>λ 25 12 41.58<br>L 83 0 33.40   | Ganges River No. 40 s.<br>(Mirzapur) On right bank.<br>λ 25 13 26.40<br>L 83 4 6.54                                 |
| Ganges River No. 20 s.<br>(Mirzapur) On left bank.<br>λ 25 12 28.20<br>L 82 58 18.18                                                          | Ganges River No. 30 s.<br>(Mirzapur) On right bank.<br>λ 25 12 16.02<br>L 83 0 52.62 | Ganges River No. 41 s.<br>(Benares) On left bank.<br>λ 25 14 7.42<br>L 83 3 33.68                                   |
| Ganges River No. 21 s.<br>(Mirzapur) On right bank.<br>λ 25 12 10.53<br>L 82 58 32.26                                                         | Ganges River No. 31 s.<br>(Benares) On left bank.<br>λ 25 12 46.77<br>L 83 0 50.35   | Ganges River No. 42 s.<br>(Mirzapur) Also called Chota Mirzapur, on right<br>bank.<br>λ 25 14 13.59<br>L 83 4 30.79 |
| Ganges River No. 22 s.<br>(Mirzapur) On left bank.<br>λ 25 12 34.69<br>L 82 58 40.96                                                          | Ganges River No. 32 s.<br>(Mirzapur) On right bank.<br>λ 25 12 14.10<br>L 83 1 25.55 | Ganges River No. 43 s.<br>(Benares) On left bank.<br>λ 25 14 42.42<br>L 83 3 58.74                                  |
| Ganges River No. 23 s.<br>(Mirzapur) On right bank.<br>λ 25 12 14.66<br>L 82 59 9.81                                                          | Ganges River No. 33 s.<br>(Benares) On left bank.<br>λ 25 12 48.88<br>L 83 1 40.78   | Ganges River No. 44 s.<br>(Benares) On right bank.<br>λ 25 15 24.21<br>L 83 4 20.22                                 |
|                                                                                                                                               | Ganges River No. 34 s.<br>(Mirzapur) On right bank.<br>λ 25 12 12.95<br>L 83 2 3.44  | Ganges River No. 45 s.<br>(Benares) On left bank.<br>λ 25 15 4.31<br>L 83 3 35.34                                   |



| Name of station, district, description,<br>co-ordinates &c.                            | Name of station, district, description,<br>co-ordinates &c.                           | Name of station, district, description,<br>co-ordinates &c.                                                       |
|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Ganges River No. 46 s.<br>(Benares) On left bank.<br>λ 25 15 47.90<br>L 83 3 18.25     | Ganges River No. 56 s.<br>(Ghazipur) On right bank.<br>λ 25 35 6.46<br>L 83 42 8.36   | Ganges River No. 67 s.<br>(Ghazipur) On right bank.<br>λ 25 32 6.64<br>L 83 48 1.14                               |
| Ganges River No. 47 s.<br>(Benares) On left bank.<br>λ 25 16 47.44<br>L 83 2 56.17     | Ganges River No. 57 s.<br>(Ghazipur) On left bank.<br>λ 25 36 9.02<br>L 83 42 50.69   | Ganges River No. 68† s.<br>(Ghazipur) On left bank.<br>λ 25 32 54.49<br>L 83 49 30.57                             |
| Ganges River No. 48 s.<br>(Benares) On left bank.<br>λ 25 17 3.92<br>L 83 3 0.44       | Ganges River No. 58 s.<br>(Ghazipur) On right bank.<br>λ 25 34 55.42<br>L 83 43 18.13 | Ganges River No. 69† s.<br>(Ghazipur) On right bank.<br>λ 25 31 30.95<br>L 83 49 47.61                            |
| Ganges River No. 49 s.<br>(Benares) On right bank.<br>λ 25 17 37.13<br>L 83 3 57.60    | Ganges River No. 59 s.<br>(Ghazipur) On left bank.<br>λ 25 36 10.17<br>L 83 43 53.76  | Garda, VI.<br>(Shahabad. Vide page 4—o.)<br>λ 24 50 54.86<br>L 83 34 54.96<br>H 1065<br>h I<br>No. 5              |
| Ganges River No. 50* s.<br>(Benares) On right bank.<br>λ 25 17 57.21<br>L 83 4 20.00   | Ganges River No. 60 s.<br>(Ghazipur) On right bank.<br>λ 25 34 44.83<br>L 83 43 41.57 | Gaura, XI.<br>(Ghazipur. Vide page 5—o.)<br>λ 25 37 59.15<br>L 83 17 4.76<br>H 289<br>h 20<br>No. 13              |
| Ganges River No. 51* s.<br>(Benares) On right bank.<br>λ 25 18 40.58<br>L 83 4 50.54   | Ganges River No. 61 s.<br>(Ghazipur) On left bank.<br>λ 25 35 59.39<br>L 83 45 31.74  | Gharbaria, LVIII‡.<br>(Gorakhpur. Vide page 8—o.)<br>λ 27 2 52.80<br>L 83 17 32.64<br>H 279.60§<br>h 25<br>No. 30 |
| Ganges River No. 52* s.<br>(Ghazipur) On right bank.<br>λ 25 34 11.16<br>L 83 38 5.52  | Ganges River No. 62 s.<br>(Ghazipur) On right bank.<br>λ 25 34 16.11<br>L 83 44 34.29 | Ghauspur Dome.<br>(Ghazipur)<br>λ 25 36 44.6<br>L 83 44 28.1                                                      |
| Ganges River No. 53* s.<br>(Ghazipur) On right bank.<br>λ 25 34 51.64<br>L 83 39 32.15 | Ganges River No. 63 s.<br>(Ghazipur) On right bank.<br>λ 25 33 38.78<br>L 83 45 30.38 | Ghazipur Chapel.<br>(Ghazipur) Belfry of Roman Catholic Chapel.<br>λ 25 33 43.0<br>L 83 35 21.0                   |
| Ganges River No. 54 s.<br>(Ghazipur) On right bank.<br>λ 25 35 0.56<br>L 83 40 39.61   | Ganges River No. 64 s.<br>(Ghazipur) On left bank.<br>λ 25 34 0.66<br>L 83 46 42.54   | Ghazipur Church Steeple.<br>(Ghazipur) In Cantonment.<br>λ 25 33 36.46<br>L 83 35 14.25                           |
| Ganges River No. 55 s.<br>(Ghazipur) On left bank.<br>λ 25 36 0.58<br>L 83 41 28.29    | Ganges River No. 65 s.<br>(Ghazipur) On right bank.<br>λ 25 32 40.05<br>L 83 46 52.08 |                                                                                                                   |
|                                                                                        | Ganges River No. 66 s.<br>(Ghazipur) On left bank.<br>λ 25 33 23.71<br>L 83 48 3.44   |                                                                                                                   |

\* Two portions of the River Ganges were spanned by the Secondary Series here given, of which one lies to the west and the other to the east of the Principal Triangulation; the two series are not continuous, the western terminates at stations 50 and 51, the eastern begins at 52 and 53. † The continuation of this triangulation will be found in the Co-ordinate List of the Hurlong Meridional Series. ‡ Of the North-East Longitudinal Series. § This height refers to the mark-stone let into the ground floor of the tower.

| Name of station, district, description,<br>co-ordinates &c.                                                             | Name of station, district, description,<br>co-ordinates &c.                                                                                                          | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ghazipur City No. 1 s.<br>(Ghazipur) On Nawáb Hikmat Ali Khán's Chahalsutún.<br>λ 25 35 1°51'<br>L 83 38 24°34'         | Ghazipur New Burial Ground,<br>(Ghazipur) Highest tomb.<br>λ 25 33 6°9'<br>L 83 34 33°0'                                                                             | Gogra River No. 60 s.<br>(Gorakhpur) On left bank, 0·8 of a mile W. of the large village of Painah.<br>λ 26 15 14°53'<br>L 83 48 50°66'                                                                       |
| Ghazipur City No. 2 s.<br>(Ghazipur) On Chahalsutún gateway, Nawáb's Sarai.<br>λ 25 35 6°02'<br>L 83 38 20°74'          | Ghazipur Old Burial Ground.<br>(Ghazipur)<br>λ 25 34 45'<br>L 83 35 2'                                                                                               | Gogra River No. 61 s.<br>(Azamgarh) On right bank, about 0·1 of a mile N.E. of Harnhi Tola and the same distance N.W. of Mallah Tola.<br>λ 26 13 44°46'<br>L 83 46 12°40'                                     |
| Ghazipur Fort.<br>(Ghazipur) Shiv Nārāyan Rái's house in old fort.<br>λ 25 34 48°9'<br>L 83 38 5°0'                     | Ghazipur Permit Office,<br>(Ghazipur) Chimney.<br>λ 25 35 20°1'<br>L 83 38 51°9'                                                                                     | Gogra River No. 62 s.<br>(Gorakhpur) On left bank, on a high mound near the large village of Barhaj and close to the high road to Gorakhpur.<br>λ 26 16 19°05'<br>L 83 46 17°26'                              |
| Ghazipur Hospital,<br>(Ghazipur) Medical servants' quarters.<br>λ 25 32 50°4'<br>L 83 34 55°8'                          | Ghazipur Temple No. 1.<br>(Ghazipur) Thākurdwāra temple.<br>λ 25 34 32°6'<br>L 83 36 59°3'                                                                           | Gogra River No. 63 s.<br>(Azamgarh) On right bank, 0·3 of a mile W. of Dharampur, 0·4 of a mile N. of Siswah and 0·7 of a mile N.E. of Bhansiawn.<br>λ 26 13 44°71'<br>L 83 43 5°18'                          |
| Ghazipur House No. 1.<br>(Ghazipur) Mr. Bruce's factory house.<br>λ 25 35 30°8'<br>L 83 39 11°3'                        | Ghazipur Temple No. 2.<br>(Ghazipur) Sheodayál Missar's temple.<br>λ 25 34 54°2'<br>L 83 37 39°8'                                                                    | Gogra River No. 64 s.<br>(Gorakhpur) On left bank, S.E. of and close to Rájpur and near the junction of the Rápti and Gogra rivers.<br>λ 26 16 28°26'<br>L 83 43 20°75'                                       |
| Ghazipur House No. 2.<br>(Ghazipur) Opium agent's house, signal staff.<br>λ 25 34 25°8'<br>L 83 37 10°4'                | Ghazipur Temple No. 3.<br>(Ghazipur) On Khirki Ghat.<br>λ 25 35 0°0'<br>L 83 38 19°1'                                                                                | Gogra River No. 64a s.<br>(Gorakhpur) At junction of the Gogra and Rápti rivers.<br>λ 26 16 13°94'<br>L 83 43 33°06'                                                                                          |
| Ghazipur Indigo Factory.<br>(Ghazipur) Chimney of Mr. Bruce's factory in Gosáindáspur.<br>λ 25 35 35°7'<br>L 83 39 8°2' | Ghazipur Temple No. 4.<br>(Ghazipur) Mughalpura temple.<br>λ 25 35 5°8'<br>L 83 38 30°1'                                                                             | Gogra River No. 65 s.<br>(Gorakhpur) On left bank, near the high road to Gorakhpur, 0·2 of a mile W. of Gunghat, 0·7 of a mile S. of Khairanti and 1 mile E. of Bhundadi.<br>λ 26 16 11°27'<br>L 83 40 41°80' |
| Ghazipur, Jamalpur Rauza.<br>(Ghazipur)<br>λ 25 35 33°8'<br>L 83 38 21°5'                                               | Ghazipur Temple No. 5.<br>(Ghazipur) Mádhó Dás's temple.<br>λ 25 35 5°8'<br>L 83 38 30°2'                                                                            | Gogra River No. 66 s.<br>(Azamgarh) On right bank, 0·5 of a mile N.W. of Semara and 0·5 of a mile E. of Súrājpur fort.<br>λ 26 13 52°04'<br>L 83 39 27°73'                                                    |
| Ghazipur Masjid No. 1.<br>(Ghazipur) Mausá-alam-ka-Masjid.<br>λ 25 34 36°9'<br>L 83 37 30°1'                            | Ghazipur Temple No. 6.<br>(Ghazipur) Kháki Gosáin's temple.<br>λ 25 35 23°7'<br>L 83 39 2°1'                                                                         | Gogra River No. 67 s.<br>(Gorakhpur) On left bank, 0·5 of a mile S. of Dehra.<br>λ 26 16 45°92'<br>L 83 38 25°02'                                                                                             |
| Ghazipur Masjid No. 2.<br>(Ghazipur) In Nawábganj.<br>λ 25 35 21°7'<br>L 83 38 22°0'                                    | Gidwas Hill Mark.<br>(Mirzapur) On platform, about 2 miles N.E. of Bandhaura village and 2½ miles N.W. of Panki Purwa.<br>λ 24 30 39°26'<br>L 83 11 24°25'<br>No. 49 |                                                                                                                                                                                                               |
| Ghazipur Monument.<br>(Ghazipur) Spire of dome of Lord Cornwallis's Monument.<br>λ 25 33 30°7'<br>L 83 35 19°7'         | Gogra River No. 59* s.<br>(Azamgarh) On right bank, near a Sota on an island and surrounded by Jhau jungle.<br>λ 26 12 57°76'<br>L 83 49 17°96'                      |                                                                                                                                                                                                               |

\* The preceding portion of this triangulation will be found in the Co-ordinate List of the Hurláong Meridional Series and the continuation in that of the Gurwáni Meridional Series.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                      | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                       | Name of station, district, description,<br>co-ordinates &c.                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gogra River No. 68 s.<br>(Azamgarh) On right bank, 0.3 of a mile N. of Belwabi and 0.6 of a mile E. of Gauridi.<br>λ 26 14 7.91<br>L 83 36 36.05                                                                                                 | Gogra River No. 78 s.<br>(Azamgarh) On right bank, 0.4 of a mile N. of Barāmadpur and 1 mile E. of Sahabdia.<br>λ 26 15 10.33<br>L 83 28 16.63                                                    | Gogra River No. 88 s.<br>(Azamgarh) On right bank, 0.2 of a mile S.W. of Dangardhia and 0.3 of a mile N.W. of Nawa Tola.<br>λ 26 17 33.85<br>L 83 14 49.11                    |
| Gogra River No. 69 s.<br>(Gorakhpur) On left bank, 0.2 of a mile W. of Kunda Tola.<br>λ 26 17 9.73<br>L 83 36 21.74                                                                                                                              | Gogra River No. 79 s.<br>(Gorakhpur) On Madraha fort on left bank.<br>λ 26 17 25.50<br>L 83 27 11.38                                                                                              | Gogra River No. 89 s.<br>(Gorakhpur) On left bank, 0.7 of a mile S. of Shio-<br>pur Tola and 1.3 miles S.W. of Bfbipur.<br>λ 26 19 21.42<br>L 83 13 25.12                     |
| Gogra River No. 70 s.<br>(Azamgarh) On right bank, 0.1 of a mile W. of Sarala village.<br>λ 26 16 8.18<br>L 83 34 30.80                                                                                                                          | Gogra River No. 80 s.<br>(Azamgarh) On right bank, 0.6 of a mile N. of Kunrohwa and 0.6 of a mile E. of Bariarganj.<br>λ 26 16 59.06<br>L 83 25 16.51                                             | Gogra River No. 90 s.<br>(Azamgarh) On right bank, 0.2 of a mile N. of Patkauli and 0.7 of a mile E. of Tiprajpur.<br>λ 26 16 4.30<br>L 83 11 52.33                           |
| Gogra River No. 71 s.<br>(Gorakhpur) On left bank, on a mud fort in Nar-<br>harpur village.<br>λ 26 16 42.67<br>L 83 33 57.86                                                                                                                    | Gogra River No. 81 s.<br>(Gorakhpur) On left bank at its junction with the<br>Konna nadi, 0.2 of a mile W. of Marha and about<br>the same distance from Shiopur.<br>λ 26 19 22.19<br>L 83 25 8.67 | Gogra River No. 91 s.<br>(Gorakhpur) On left bank, 0.6 of a mile S.W. of<br>Hukia and 0.7 of a mile S. of Hukia village.<br>λ 26 19 5.60<br>L 83 11 55.46                     |
| Gogra River No. 72 s.<br>(Azamgarh) On right bank, 0.5 of a mile S.E. of<br>Deori and 0.25 of a mile N.E. of Bhurabar Tola.<br>λ 26 15 57.71<br>L 83 33 30.72                                                                                    | Gogra River No. 82 s.<br>(Azamgarh) On right bank, 0.6 of a mile W. of<br>Hajipur, 0.2 of a mile N.E. of Bhadaura and 0.75 of<br>a mile E. of Bānka.<br>λ 26 17 30.54<br>L 83 22 56.30            | Gogra River No. 92 s.<br>(Azamgarh) On right bank, 0.2 of a mile W. of<br>Nahrupur and 1.2 miles S.E. of Bankatwa.<br>λ 26 17 32.06<br>L 83 9 50.15                           |
| Gogra River No. 73 s.<br>(Gorakhpur) On left bank, on a paka house near<br>the Ghat in the large village of Barhulganj.<br>λ 26 16 49.18<br>L 83 33 2.41                                                                                         | Gogra River No. 83 s.<br>(Gorakhpur) On left bank, 1.3 miles S.W. of Sri-<br>nagar and 1.4 miles S.E. of Bhiropur.<br>λ 26 19 35.39<br>L 83 22 45.79                                              | Gogra River No. 93 s.<br>(Fyzabad) On right bank, 0.6 of a mile N.E. of<br>Bhadaina.<br>λ 26 19 46.72<br>L 83 8 59.54                                                         |
| Gogra River No. 74 s.<br>(Azamgarh) On right bank, 0.5 of a mile N.W. of<br>Dhanauti village.<br>λ 26 15 53.71<br>L 83 32 32.06                                                                                                                  | Gogra River No. 84 s.<br>(Azamgarh) On right bank, 1.4 miles N. of Rauna-<br>pār and 1 mile N.E. of Mansāganj.<br>λ 26 18 14.99<br>L 83 19 38.40                                                  | Gogra River No. 94 s.<br>(Gorakhpur) On left bank, 0.2 of a mile S. of<br>Pande Sisawa and 0.6 of a mile S.W. of Rāmdia<br>Sisawa.<br>λ 26 21 36.29<br>L 83 11 34.25          |
| Gogra River No. 75 s.<br>(Gorakhpur) On left bank, 0.6 of a mile W. of<br>Jaipār village and 0.2 of a mile S.W. of a paka<br>building (Devi's Sthān). The road to Gorakhpur<br>passes close N. of the station.<br>λ 26 16 54.69<br>L 83 31 28.12 | Gogra River No. 85 s.<br>(Gorakhpur) On left bank, 0.4 of a mile S. of Shio-<br>pur and 0.2 of a mile S.E. of Dewal Pande's Tola.<br>λ 26 19 59.91<br>L 83 20 33.54                               | Gogra River No. 95 s.<br>(Fyzabad) On right bank, 1.4 miles E. of Kaithia<br>and 1.5 miles S.E. of Gamaria paka building (Sati).<br>λ 26 22 40.02<br>L 83 7 56.31             |
| Gogra River No. 76 s.<br>(Azamgarh) On right bank, 0.2 of a mile N.W. of<br>Nauli village.<br>λ 26 15 22.78<br>L 83 30 45.19                                                                                                                     | Gogra River No. 86 s.<br>(Gorakhpur) On left bank, 1 mile S. of Kaliānpur<br>and 0.4 of a mile S.W. of Urdiha Tola.<br>λ 26 20 0.88<br>L 83 18 12.54                                              | Gogra River No. 95 <sub>1</sub> s.<br>(Fyzabad) On right bank, 0.6 of a mile N.E. of<br>Raimanpur and 0.4 of a mile E. of Pikar.<br>λ 26 22 12.72<br>L 83 7 42.78             |
| Gogra River No. 77 s.<br>(Gorakhpur) On left bank, 0.4 of a mile N.E. of<br>Dalua and 0.6 of a mile S. of Nawāda.<br>λ 26 16 45.38<br>L 83 28 59.60                                                                                              | Gogra River No. 87 s.<br>(Azamgarh) On right bank, 0.8 of a mile N. W. of<br>Guriana Tola and 0.4 of a mile S.W. of Khar-Khaia.<br>λ 26 18 5.18<br>L 83 17 11.24                                  | Gogra River No. 96 s.<br>(Gorakhpur) On left bank, 0.1 of a mile W. of<br>Tennai and 0.5 of a mile S. of Khairanti on the road<br>to Belwa.<br>λ 26 23 19.44<br>L 83 10 30.17 |

| Name of station, district, description,<br>co-ordinates &c.                                                                                          | Name of station, district, description,<br>co-ordinates &c.                                                                                                     | Name of station, district, description,<br>co-ordinates &c.                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Gogra River No. 97 s.<br>(Gorakhpur) On left bank, 0.1 of a mile N.W. of Nurgara and 0.2 of a mile S.W. of Tikapur.                                  | Gogra River No. 107 s.<br>(Fyzabad) On right bank, near Chahora Ghat.                                                                                           | Gorakhpur House No. 1.<br>(Gorakhpur) Bábu Hari's house.                                                      |
| λ 26 24 48.45<br>L 83 8 55.10                                                                                                                        | λ 26 30 44.06<br>L 82 56 51.25                                                                                                                                  | λ 26 45 3.9<br>L 83 23 28.6                                                                                   |
| Gogra River No. 98 s.<br>(Fyzabad) On right bank, near Khamaria Ghat, 0.3 of a mile E. of Janpur.                                                    | Gogra River No. 108 s.<br>(Basti) On left bank, 0.5 of a mile N.W. of Kalilapur, 0.2 of a mile E. of Surha and 1 mile S. of Udua.                               | Gorakhpur House No. 2.<br>(Gorakhpur) Domingar Collector's house.                                             |
| λ 26 23 59.54<br>L 83 6 59.95                                                                                                                        | λ 26 32 13.70<br>L 82 58 12.95                                                                                                                                  | λ 26 45 37.4<br>L 83 22 6.9                                                                                   |
| Gogra River No. 99 s.<br>(Basti) On left bank, 0.4 of a mile N. of Dholbája, 0.1 of a mile N.E. of Gaighat Tola and 0.4 of a mile W. of Kataha.      | Gogra River No. 109 s.<br>(Basti) On left bank, 1.3 miles W. of Gobindganj, 0.8 of a mile S. W. of Nakahi and 0.6 of a mile E. of Teghpur.                      | Gorakhpur Jail.<br>(Gorakhpur) Upper ward.                                                                    |
| λ 26 26 22.68<br>L 83 7 4.02                                                                                                                         | λ 26 33 7.88<br>L 82 56 20.76                                                                                                                                   | λ 26 44 46<br>L 83 23 38                                                                                      |
| Gogra River No. 100 s.<br>(Fyzabad) On right bank, on a fort belonging to the Talukdar of Chandipur.                                                 | Gogra River No. 110 s.<br>(Fyzabad) On right bank, 0.3 of a mile N.W. of Maini village, on an old paka fort close to the water's edge.                          | Gorakhpur Mosque.<br>(Gorakhpur) Near Rajghat.                                                                |
| λ 26 24 57.18<br>L 83 6 1.87                                                                                                                         | λ 26 32 35.21<br>L 82 53 54.83                                                                                                                                  | λ 26 44 28.6<br>L 83 23 37.6                                                                                  |
| Gogra River No. 101 s.<br>(Basti) On left bank, 0.3 of a mile N.W. of Tilah, 0.4 of a mile S. of Rampur and 0.7 of a mile N.E. of Daulatpur.         | Gogra River No. 111 s.<br>(Basti) On left bank, contiguous to the village of Dihupura, 0.3 of a mile W. of Ismailpur or Pareo and 0.5 of a mile S.W. of Chibra. | Gorakhpur Temple.<br>(Gorakhpur) On Rajghat.                                                                  |
| λ 26 28 10.38<br>L 83 5 50.89                                                                                                                        | λ 26 36 5.17<br>L 82 53 40.44                                                                                                                                   | λ 26 44 10.2<br>L 83 23 45.4                                                                                  |
| Gogra River No. 102 s.<br>(Fyzabad) On right bank close to the water's edge, and on the edge of a patch of thorny jungle.                            | Gogra River No. 112 s.<br>(Fyzabad) On right bank, 0.3 of a mile N.E. of Tarauli.                                                                               | Gosáindáspur Temple.<br>(Ghazipur)                                                                            |
| λ 26 27 37.40<br>L 83 3 40.04                                                                                                                        | λ 26 33 29.99<br>L 82 52 19.02                                                                                                                                  | λ 25 35 9.1<br>L 83 38 36.5                                                                                   |
| Gogra River No. 103 s.<br>(Basti) On left bank, 0.4 of a mile W. of Turkaulin, 1 mile S.W. of Unchágon and 0.6 of a mile S. of the Chapra Gurudwara. | Gogra River No. 113 s.<br>(Basti) On left bank, 0.9 of a mile S. of Parmesra-pur and 0.7 of a mile S.E. of Dhusua.                                              | Hara Sida Hill Flag.<br>(Lohardugga)                                                                          |
| λ 26 29 28.51<br>L 83 3 20.45                                                                                                                        | λ 26 35 43.76<br>L 82 51 11.73                                                                                                                                  | λ 23 56 11.2<br>L 83 42 2.8                                                                                   |
| Gogra River No. 104 s.<br>(Fyzabad) On right bank, in a patch of thorny jungle and E. of Masuraha village.                                           | Gogra River No. 114 s.<br>(Fyzabad) On right bank, 0.1 of a mile N. of Lachipur, and 0.2 of a mile S.E. of Mathia.                                              | See 'Hará Sida' of the Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral. |
| λ 26 28 6.94<br>L 83 2 53.16                                                                                                                         | λ 26 33 39.20<br>L 82 50 49.20                                                                                                                                  | Hirdepur, IX.<br>(Benares. Vide page 5—o.)                                                                    |
| Gogra River No. 105 s.<br>(Fyzabad) On right bank, in Kasba Berar.                                                                                   | Gora, XXXV.*<br>(Mirzapur. Vide page 3—o.)                                                                                                                      | λ 25 24 23.05<br>L 83 16 42.64<br>H, 288.88†<br>h 32<br>No. 11                                                |
| λ 26 29 12.11<br>L 83 0 27.71                                                                                                                        | λ 24 4 55.71<br>L 83 16 40.65<br>H 1828<br>h 3<br>No. 1                                                                                                         | Ilia Siwála,<br>(Shahabad) Higher of two, in the middle of the village.                                       |
| Gogra River No. 106 s.<br>(Basti) On left bank, 0.6 of a mile N.W. of Gularia and 0.2 of a mile S.E. of Chapra.                                      | Gorakhpur Building.<br>(Gorakhpur) Gházi Mián-ka-Rauza.                                                                                                         | λ 25 4 26.6<br>L 83 22 45.6<br>No. 86                                                                         |
| λ 26 31 25.21<br>L 83 0 16.48                                                                                                                        | λ 26 45 20.4<br>L 83 22 53.0                                                                                                                                    | Kanaun, XII.<br>(Ghazipur. Vide page 5—o.)                                                                    |
|                                                                                                                                                      |                                                                                                                                                                 | λ 25 43 3.62<br>L 83 26 18.56<br>H, 270.52‡<br>h 20<br>No. 14                                                 |

\* Of the Calcutta Longitudinal Series of the South-East Quadrilateral. † This height refers to the upper surface of the tower. ‡ This height refers to the mark-stone let into the upper surface of the pillar.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                             | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                    | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Kandakot, II.</b><br><i>(Mirzapur. Vide page 3—0.)</i><br>$\lambda$ 24 37 56.86<br>$L$ 83 2 37.78<br>$H$ 1446<br>$h$ Not forthcoming<br>No. 2                        | <b>Kharakpur, XIII.</b><br><i>(Azamgarh. Vide page 5—0.)</i><br>$\lambda$ 25 50 8.73<br>$L$ 83 16 13.26<br>$H$ 286<br>$h$ 20<br>No. 15                                                                                                         | <b>Kotan Hill Stone.</b><br><i>(Lohardugga)</i><br>$\lambda$ 24 6 2.2<br>$L$ 83 44 34.0<br>See Synoptical Vol. of the Calcutta Longitudinal Series of the South-East Quadrilateral.                                                                                                    |
| <b>Kandwa h.s.</b><br><i>(Mirzapur)</i> About a mile S. of village so called and 2 miles N. of Diwi village.<br>$\lambda$ 24 17 26.72<br>$L$ 83 24 25.80<br>Nos. 36, 37 | <b>Khás Bargawa Mark.</b><br><i>(Mirzapur)</i><br>$\lambda$ 25 1 12.30<br>$L$ 82 49 48.69                                                                                                                                                      | <b>Kothádei Platform.</b><br><i>(Mirzapur)</i> On left bank of the Son river.<br>$\lambda$ 24 31 37.3<br>$L$ 83 28 39.6<br>No. 52                                                                                                                                                      |
| <b>Kariapahár Shikhar.</b><br><i>(Mirzapur)</i> About 2 miles N.E. of Budim village and $\frac{1}{2}$ miles W. of Dhusuria.<br>$\lambda$ 24 57 4<br>$L$ 83 10 45        | <b>Khempur h.s.</b><br><i>(Mirzapur)</i> About $2\frac{1}{2}$ miles S. of village so called and 3 miles W. of Kon Khás village.<br>$\lambda$ 24 25 11.77<br>$L$ 83 21 41.43<br>Nos. 34, 35                                                     | <b>Kuba h.s.</b><br><i>(Mirzapur)</i> About $1\frac{1}{2}$ miles N. of Kuba Khurd (small) village.<br>$\lambda$ 25 2 20.26<br>$L$ 82 51 9.34                                                                                                                                           |
| <b>Katailwa Temple.</b><br><i>(Gorakhpur)</i><br>$\lambda$ 26 17 25.9<br>$L$ 83 44 23.4                                                                                 | <b>Khorádi, IV.</b><br><i>(Mirzapur. Vide page 4—0.)</i><br>$\lambda$ 24 54 22.50<br>$L$ 83 0 42.69<br>$H$ 1037<br>$h$ Not forthcoming<br>No. 8                                                                                                | <b>Kurtha Temple.</b><br><i>(Ghazipur)</i> On ghat.<br>$\lambda$ 25 32 43.9<br>$L$ 83 34 48.5                                                                                                                                                                                          |
| <b>Katesar Temple,</b><br><i>(Benares)</i> Half finished in 1846.<br>$\lambda$ 25 16 53.0<br>$L$ 83 4 58.3                                                              | <b>Kona Building.</b><br><i>(Mirzapur)</i> White building in village.<br>$\lambda$ 24 25 27.3<br>$L$ 83 23 32.6<br>No. 46                                                                                                                      | <b>Kusáhi Temple.</b><br><i>(Mirzapur)</i><br>$\lambda$ 25 10 22.1<br>$L$ 82 54 55.7<br>See Synoptical Vol. of the Gurwáni Meridional Series.                                                                                                                                          |
| <b>Kathaut Indigo Factory.</b><br><i>(Ghazipur)</i> W. corner of roof of bungalow.<br>$\lambda$ 25 36 31.6<br>$L$ 83 43 36.9                                            | <b>Kona Temple No. 1.</b><br><i>(Mirzapur)</i> White temple at the northern extremity of village.<br>$\lambda$ 24 25 41.0<br>$L$ 83 23 37.8<br>No. 47                                                                                          | <b>Kusumi Temple.</b><br><i>(Ghazipur)</i><br>$\lambda$ 25 33 18.3<br>$L$ 83 29 41.5                                                                                                                                                                                                   |
| <b>Katwar, XXII.</b><br><i>(Gorakhpur. Vide page 6—0.)</i><br>$\lambda$ 26 33 54.34<br>$L$ 83 20 27.59<br>$H_s$ 271.16*<br>$h$ 23<br>No. 24                             | <b>Kona Temple No. 2.</b><br><i>(Mirzapur)</i> Old temple 500 yards N.W. of village.<br>$\lambda$ 24 25 53.7<br>$L$ 83 23 19.9<br>No. 48                                                                                                       | <b>Larikákudan t.s.</b><br><i>(Benares)</i><br>$\lambda$ 25 22 25.40<br>$L$ 83 3 59.36                                                                                                                                                                                                 |
| <b>Kázipur Temple.</b><br><i>(Basti)</i><br>$\lambda$ 26 45 14.9<br>$L$ 83 10 46.7                                                                                      | <b>Kota h.s.</b><br><i>(Shahabad)</i> On a hill about $1\frac{1}{2}$ miles S. of the large village of Iliá and $\frac{1}{4}$ mile S.W. of Máláda, a small village; pargana Chainpur.<br>$\lambda$ 25 2 53.67<br>$L$ 83 22 34.65<br>Nos. 77, 78 | <b>Latífgarh Fort,</b><br><i>(Mirzapur)</i> N.E. tower.<br>$\lambda$ 24 59 4.5<br>$L$ 83 4 32.9<br>No. 97                                                                                                                                                                              |
| <b>Khám, V.</b><br><i>(Shahabad. Vide page 4—0.)</i><br>$\lambda$ 24 47 20.99<br>$L$ 83 33 33.40<br>$H$ 1442<br>$h$ Not forthcoming<br>No. 4                            | <b>Madráha Masjid,</b><br><i>(Basti)</i> N. minaret.<br>$\lambda$ 26 31 34.2<br>$L$ 82 59 23.4                                                                                                                                                 | <b>Magan Diwána h.s.</b><br><i>(Mirzapur)</i> On an isolated hill about 1 mile N.E. of Ahraura; pargana Bhoili. A platform on the highest part of the hill, the top of which is nearly flat, denotes the site of observation.<br>$\lambda$ 25 1 59.82<br>$L$ 83 5 51.18<br>Nos. 91, 92 |

\* This height refers to the mark-stone let into the ground floor of the tower.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Magarda h.s.<br/>(Mirzapur) About 2 miles N.W. of Gudaun village.</p> <p>λ 24 34 2°01<br/>L 83 17 34°93<br/>No. 42</p> <p>Mahesari h.s.<br/>(Shahabad) On the highest part of a hill about 2½ miles S.W. of the large village of Bhubooah and ½ mile N.W. of Rámgarh, a small village; pargana Chainpur.</p> <p>λ 24 58 58°98<br/>L 83 36 27°14<br/>Nos. 70, 71</p> <p>Málda House.<br/>(Mirzapur-Shahabad) In centre of village.</p> <p>λ 25 3 30°8<br/>L 83 22 59°9<br/>No. 82</p> <p>Mangesar Hill Mark.<br/>(Mirzapur) On platform, about 2 miles S. of Belach and 2½ miles W. of Markánda.</p> <p>λ 24 31 44°19<br/>L 83 6 52°67<br/>Nos. 53, 54</p> <p>Milkípúr Temple.<br/>(Benares) On ghat.</p> <p>λ 25 14 30°9<br/>L 83 4 29°2</p> <p>Mirgaráni h.s.<br/>(Mirzapur) On the highest point of a hill about a mile N. of Gonda village and the same distance W. of Korlíhi.</p> <p>λ 24 4 54°87<br/>L 83 18 6°60<br/>Nos. 40, 41</p> <p>Miria Temple,<br/>(Mirzapur) Spire.</p> <p>λ 25 7 52°4<br/>L 82 54 39°7<br/>No. 109</p> <p>Moraina h.s.<br/>(Shahabad) On a hill above Jamni Nar village. A platform marks the site of observation.</p> <p>λ 24 51 36°89<br/>L 83 30 21°69<br/>No. 58</p> <p>Muhammadpur, XXV.<br/>(Gorakhpur. Vide page 7—o.)</p> <p>λ 26 46 28°95<br/>L 83 9 17°10<br/>H 283<br/>h 28<br/>No. 27</p> | <p>Muhammadpur Masjid.<br/>(Azamgarh)</p> <p>λ 26 10 30°0<br/>L 83 16 51°0</p> <p>Murádeo Building.<br/>(Benares)</p> <p>λ 25 13 18<br/>L 83 0 47</p> <p>Murádeo Temple.<br/>(Benares)</p> <p>λ 25 13 19°1<br/>L 83 0 47°2</p> <p>Murgari Hill Mark (heliotrope).<br/>(Mirzapur) On the highest part of the bluff.</p> <p>λ 24 7 6°32<br/>L 83 16 38°34<br/>No. 45</p> <p>Murli h.s.<br/>(Mirzapur) On a hill about 2 miles S. of the Ganges.</p> <p>λ 25 5 21°45<br/>L 82 51 22°55<br/>Nos. 104, 105</p> <p>Nandaur, XXVII.<br/>(Basti. Vide page 7—o.)</p> <p>λ 26 56 39°76<br/>L 83 6 58°38<br/>H 302<br/>h 26<br/>No. 29</p> <p>Nandganj Masjid.<br/>(Ghazipur)</p> <p>λ 25 32 34°3<br/>L 83 27 5°2</p> <p>Narharpur Rája's House,<br/>(Gorakhpur) W. kalas.</p> <p>λ 26 16 48°5<br/>L 83 34 22°7</p> <p>Naugarh Building,<br/>(Mirzapur) Flag.</p> <p>λ 24 50 23°2<br/>L 83 18 48°5<br/>No. 63</p> <p>Pahária h.s.<br/>(Shahabad) On a small rocky hill covered with jungle and rising about 60 feet above the surrounding plain, 200 yards S.E. of the village of that name and 2½ miles N. of Rámgarh; pargana Chainpur. A stone with ☉ engraved on it and covered over with a pile of stones, marks the station.</p> <p>λ 25 0 3°08<br/>L 83 38 35°34<br/>No. 69</p> | <p>Parmandápur Semaphore.<br/>(Mirzapur) About 3 miles N. of Ilia village.</p> <p>λ 25 7 42°8<br/>L 83 22 58°2<br/>Nos. 88, 89</p> <p>Parmit Temple.<br/>(Ghazipur)</p> <p>λ 25 31 37°4<br/>L 83 31 55°0</p> <p>Patíta Fort.<br/>(Mirzapur) S.E. turret of palace.</p> <p>λ 25 3 5°3<br/>L 82 59 47°0</p> <p>Pípardar h.s.<br/>(Mirzapur) On a hill about 1 mile E. of Pathári village. A platform marks the site of observation.</p> <p>λ 24 32 17°65<br/>L 83 14 26°57<br/>Nos. 32, 33</p> <p>Pirozpur Bridge.<br/>(Ghazipur) Over the Besu river.</p> <p>λ 25 39 31°5<br/>L 83 31 56°4</p> <p>Pirozpur Factory,<br/>(Ghazipur) Godown.</p> <p>λ 25 39 34<br/>L 83 31 55</p> <p>Rájabári, XXVI.<br/>(Gorakhpur. Vide page 7—o.)</p> <p>λ 26 54 3°04<br/>L 83 18 2°67<br/>Hs 267°89*<br/>h 28<br/>No. 28</p> <p>Rája Kirpál-ka-Pahár h.s.<br/>(Mirzapur) On a hill which is connected by a lower ridge with the table-land of the Bindháchal and to the left of the road from Ahraura to Lauari by Amdar Ghat, and ½ a mile S. of Ahraura; pargana Bhoili. A small platform marks the station.</p> <p>λ 24 59 49°04<br/>L 83 5 12°06<br/>Nos. 95, 96</p> <p>Rájgarh, XX.<br/>(Gorakhpur. Vide page 6—o.)</p> <p>λ 26 25 14°66<br/>L 83 25 32°76<br/>Hs 257°32*<br/>h 26<br/>No. 22</p> |

\* This height refers to the mark-stone let into the ground floor of the tower.

| Name of station, district, description,<br>co-ordinates &c.                                                                          | Name of station, district, description,<br>co-ordinates &c.                                                               | Name of station, district, description,<br>co-ordinates &c.                                             |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Rámgarh Building.<br>(Mirzapur) Centre of white house.<br>λ 24 39 44.4<br>L 83 17 6.2<br>No. 57                                      | Saipur Temple.<br>(Gorakhpur)<br>λ 26 43 43.9<br>L 83 23 30.5                                                             | Sikandarpur Siwála.<br>(Mirzapur)<br>λ 25 5 15.4<br>L 83 13 42.1<br>No. 85                              |
| Rámgarh Siwála,<br>(Shahabad) Small.<br>λ 24 58 26.1<br>L 83 37 6.8<br>No. 72                                                        | Samaspur House,<br>(Mirzapur) Doorway near river.<br>λ 25 6 30.3<br>L 82 53 23.2                                          | Sikhári Factory,<br>(Ghazipur) Bungalow chimney.<br>λ 25 43 19.9<br>L 83 28 55.1                        |
| Rámgarh Temple.<br>(Mirzapur)<br>λ 25 7 56.7<br>L 82 49 35.8                                                                         | Samenda, XV.<br>(Azamgarh. Vide page 6—o.)<br>λ 26 0 23.97<br>L 83 15 57.85<br>H <sub>s</sub> 260.29*<br>h 25<br>No. 17   | Sikri, VII.<br>(Benares. Vide page 4—o.)<br>λ 25 12 2.53<br>L 83 15 14.76<br>H 293<br>h 27<br>Nos. 6, 9 |
| Ramna House.<br>(Benares) Puka kothi in the park.<br>λ 25 14 55.1<br>L 83 3 47.7                                                     | Samra Semaphore.<br>(Mirzapur)<br>λ 25 7 7.2<br>L 83 14 59.5<br>No. 87                                                    | Sultánpur Bungalow,<br>(Mirzapur) Chimney of bow room.<br>λ 25 11 6.8<br>L 82 56 11.9                   |
| Rámnagar Fort,<br>(Benares) Flag.<br>λ 25 16 7.3<br>L 83 4 1.9                                                                       | Saraia, XXIV.<br>(Gorakhpur. Vide page 7—o.)<br>λ 26 44 10.32<br>L 83 19 1.26<br>H <sub>s</sub> 256.76*<br>h 28<br>No. 26 | Sultánpur Masjid,<br>(Mirzapur) Highest minaret.<br>λ 25 11 33.9<br>L 82 55 55.6                        |
| Rámnagar House.<br>(Benares) A large old upper storied brick house on the river side, S. of the fort.<br>λ 25 15 37.2<br>L 83 4 16.7 | Saraia Temple.<br>(Gorakhpur) In village.<br>λ 26 44 6.0<br>L 83 18 52.7                                                  | Sultánpur Monument.<br>(Mirzapur) Highest pillar in burial ground.<br>λ 25 11 31.2<br>L 82 56 8.2       |
| Rámnagar Staircase.<br>(Benares)<br>λ 25 16 7<br>L 83 4 2                                                                            | Sauram Temple No. 1,<br>(Ghazipur) Small.<br>λ 25 31 43.3<br>L 83 27 53.6                                                 | Sultánpur Stables.<br>(Mirzapur)<br>λ 25 10 37<br>L 82 55 30<br>No. 110                                 |
| Rámnagar Temple.<br>(Benares) On ghat N. of the fort.<br>λ 25 16 15.2<br>L 83 4 0.7                                                  | Sauram Temple No. 2,<br>(Ghazipur) Large.<br>λ 25 31 55.3<br>L 83 27 24.2                                                 | Sultánpur s.<br>(Mirzapur) Within the village so called.<br>λ 25 10.29.52<br>L 82 55 59.72              |
| Rámpur House.<br>(Ghazipur) Gosáin's house near village.<br>λ 25 39 18.1<br>L 83 31 32.7                                             | Sewádhi, XXXVIII†.<br>(Palamow. Vide page 3—o.)<br>λ 23 58 24.17<br>L 83 47 40.02<br>H 1956<br>h 2<br>No. 1               | Sultánpur Temple No. 1.<br>(Mirzapur)<br>λ 25 10 19.4<br>L 82 55 36.2                                   |
| Sabitpur Temple.<br>(Fyzabad)<br>λ 26 19 45.9<br>L 83 8 33.3                                                                         | Shikárganj Building.<br>(Mirzapur)<br>λ 25 0 56<br>L 83 9 49                                                              | Sultánpur Temple No. 2.<br>(Mirzapur) On ghat.<br>λ 25 10 21.5<br>L 82 55 45.7                          |
| Sahesपुरa s.<br>(Mirzapur) About ½ a mile S. of village so called.<br>λ 25 10 2.56<br>L 83 0 11.32                                   |                                                                                                                           | Sultánpur Temple No. 3.<br>(Mirzapur) Near the left bank of the Ganges.<br>λ 25 10 40.5<br>L 82 56 8.9  |

\* This height refers to the mark-stone let into the ground floor of the tower.

† Of the Calcutta Longitudinal Series.

| Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Name of station, district, description,<br>co-ordinates &c.                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Surharia Hill Mark.<br/>(Mirzapur) About 2 miles N.W. of Lendha village.<br/> <math>\lambda</math> 24 56 19.81<br/> <math>L</math> 83 18 3.76<br/> Nos. 66</p> <p>Surharia No. 1 h.s.<br/>(Mirzapur) About 1½ miles E. of Lowari village.<br/> <math>\lambda</math> 24 53 35.17<br/> <math>L</math> 83 17 16.83<br/> Nos. 59, 60</p> <p>Surharia No. 2 h.s.<br/>(Mirzapur) About 2 miles N. of Deokhar village.<br/> <math>\lambda</math> 24 52 39.98<br/> <math>L</math> 83 18 2.98<br/> Nos. 61, 62</p> | <p>Súrhaui Ghat (Pass) h.s.<br/>(Mirzapur) To the west of the pass and about 2 miles N.W. of Chirauli village. A platform marks the station.<br/> <math>\lambda</math> 24 37 4.19<br/> <math>L</math> 83 1 54.20<br/> No. 55</p> <p>Talia Indigo Factory,<br/>(Gorakhpur) Chimney of bungalow.<br/> <math>\lambda</math> 26 14 25.3<br/> <math>L</math> 83 50 56.1</p> <p>Tamalganj Building.<br/>(Mirzapur) In village on bank of the river.<br/> <math>\lambda</math> 25 6 8<br/> <math>L</math> 82 53 14<br/> No. 106</p> | <p>Tári Factory,<br/>(Ghazipur) Bungalow.<br/> <math>\lambda</math> 25 34 22.8<br/> <math>L</math> 83 39 2.9</p> <p>Tendua Masjid.<br/>(Mirzapur) On hill.<br/> <math>\lambda</math> 25 6 36.9<br/> <math>L</math> 82 54 40.6</p> <p>Thiari House,<br/>(Mirzapur) Highest, in village.<br/> <math>\lambda</math> 25 3 35.6<br/> <math>L</math> 83 21 31.7<br/> No. 83</p> |

March 1879.

J. B. N. HENNESSEY,

In charge of Computing Office.



*List of Published Works of the Great Trigonometrical Survey of India.*

---

An Account of the Measurement of an Arc of the meridian between the parallels of  $18^{\circ} 3'$  and  $24^{\circ} 7'$ , being a continuation of the Grand Meridional Arc of India as detailed by the late Lieutenant-Colonel Lambton in the Volumes of the Asiatic Society of Calcutta. By Captain George Everest, of the Bengal Artillery, F.R.S., &c. London, 1830.

An Account of the Measurement of two Sections of the Meridional Arc of India, bounded by the parallels of  $18^{\circ} 3' 5''$ ;  $24^{\circ} 7' 11''$ ; and  $29^{\circ} 30' 18''$ . By Lieutenant-Colonel Everest, F.R.S., &c., late Surveyor General of India, and his Assistants. London, 1847.

---

Account of the Operations of the Great Trigonometrical Survey of India.

- Volume I. The Standards of Measure and the Base-Lines, also an Introductory Account of the early Operations of the Survey, during the period of 1800-1830. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey. Dehra Dún, 1870.
- Do. II. History and General Description of the Principal Triangulation and of its Reduction. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.
- Do. III. The Principal Triangulation, the Base-Line Figures, the Karáchi Longitudinal, N.W. Himalaya, and Great Indus Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1873.
- Do. IV. The Principal Triangulation, the Great Arc (Section  $24^{\circ}$ - $30^{\circ}$ ), Rahún, Gurhágárh and Jogí-Tíla Meridional Series, and the Sutlej Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1876.
- Do. V. Details of the Pendulum Operations by Captains J. P. Basevi, R.E., and W. J. Heaviside, R.E., and of their Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún and Calcutta, 1879.
- Do. VI. The Principal Triangulation of the South-East Quadrilateral including the Great Arc—Section  $18^{\circ}$  to  $24^{\circ}$ , the East Coast Series, the Calcutta and the Bider Longitudinal Series, the Jabalpur and the Biláspur Meridional Series, and the Details of their Simultaneous Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1880.



*List of Published Works of the Great Trigonometrical Survey of India—(Continued).*

*Account of the Operations of the Great Trigonometrical Survey of India—(Continued).*

Volume VII. General Description of the Principal Triangulation of the North-East Quadrilateral including the Simultaneous Reduction and the Details of Five of the Component Series, the North-East Longitudinal, the Budhon Meridional, the Rangir Meridional, the Amua Meridional, and the Karara Meridional. Prepared under the directions of Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.

Do. VIII. Details of the Principal Triangulation of Eleven of the Component Series of the North-East Quadrilateral, including the following Series; the Gurwani Meridional, the Gora Meridional, the Hurilang Meridional, the Chendwar Meridional, the North Parasnath Meridional, the North Maluncha Meridional, the Calcutta Meridional, the East Calcutta Longitudinal, the Brahmaputra Meridional, the Eastern Frontier—Section 23° to 26°, and the Assam Longitudinal. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.

Do. IX. Electro-Telegraphic Longitudo Operations executed during the years 1875-77 and 1880-81, by Lieut.-Colonel W. M. Campbell, R.E., and Major W. J. Heaviside, R.E. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1883.

---

Synopses of the Results of the Great Trigonometrical Survey of India, comprising Descriptions, Co-ordinates, &c., of the Principal and Secondary Stations and other Fixed Points, of the Several Series of Triangles, as follows;—

Volume I. The Great Indus Series, or Series *D* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.

Do. II. The Great Arc—Section 24° to 30°, or Series *A* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.

Do. III. The Karachi Longitudinal Series, or Series *B* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.

Do. IV. The Gurhagarh Meridional Series, or Series *F* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.

Do. V. The Rahun Meridional Series, or Series *E* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.

Do. VI. The Jogi-Tila Meridional Series, or Series *G*, and the Sutlej Series, or Series *H* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.

Do. VII. The North-West Himalaya Series, or Series *C* of the North-West Quadrilateral, and the Triangulation of the Kashmir Survey. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.

*List of Published Works of the Great Trigonometrical Survey of India—(Continued).*

Synopses of the Results of the G. T. Survey of India, &c.—(Continued).

- Volume VIII. The Great Arc—Section  $18^{\circ}$  to  $24^{\circ}$ , or Series *A* of the South-East Quadrilateral.  
By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Superintendent of the Survey,  
and his Assistants. Dehra Dún, 1878.
- Do. IX. The Jabalpur Meridional Series, or Series *E* of the South-East Quadrilateral.  
By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and  
Superintendent of the Survey, and his Assistants. Dehra Dún, 1878.
- Do. X. The Bider Longitudinal Series, or Series *D* of the South-East Quadrilateral.  
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of  
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XI. The Biláspur Meridional Series, or Series *F* of the South-East Quadrilateral.  
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of  
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XII. The Calcutta Longitudinal Series, or Series *B* of the South-East Quadrilateral.  
By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of  
India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XIII. The East Coast Series, or Series *C* of the South-East Quadrilateral. By Major-  
General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and  
Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.
- Do. XIV. The Budhon Meridional Series, or Series *J* of the North-East Quadrilateral.  
By Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General  
of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1883.
- Do. XV. The Rangír Meridional Series, or Series *K* of the North-East Quadrilateral.  
By Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General  
of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1883.
- Do. XVI. The Amúa Meridional Series, or Series *L*, and the Karára Meridional Series,  
or Series *M* of the North-East Quadrilateral. By Lieutenant-General J. T.  
Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent  
of the Survey, and his Assistants. Dehra Dún, 1883.